AGRICULTURAL UNDER-EMPLOYMENT IN UTTAR PRADESH

THESIS FOR PH. D. DEGREE
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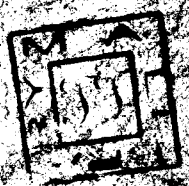

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PREFACE

0.0 The idea of writing a dissertation on agricultural under-employment has been occupying my mind ever since I first met Prof. P.C. Mahalanobis, F.R.S.[1] in October 1954, when he asked me whether I could find out the degree of disguised unemployment. During my stay at the Indian Statistical Institute in 1954-55, where some research-work was being conducted in Indian Planning, I realised that ~~that~~ there is little information available about rural manpower and its utilisation. When I returned in August 1955, to Aligarh, I started to work on the problem, and the present few pages may be taken as a pilot study in a so far neglected sphere. The scope of the present enquiry is confined to one State, Uttar Pradesh. This had to be done in order to limit the size of the enquiry and also because of the fact that the state boundaries were to change after the reorganisation and the only state whose boundaries were to remain intact was Uttar Pradesh.

PURPOSE OF ENQUIRY

0.1 The purpose of this enquiry is to provide a basis on which programmes of rural uplift and agricultural prosperity through better and greater employment of man-power can be made. That there exists a large degree of idle labour-capacity in most part of the year

1 P.C. Mahalanobis F.R.S. is Statistical Adviser to the Government of India and Secretary to the Indian Statistical Institute. He is the author of draft plan-frame to the II Five Year Plan.

is a well-known fact but no one knows even roughly its magnitude under the existing conditions, not to mention changed conditions. Some stray efforts have been made by some writers to measure the degree of underemployment in India. But these writers have been able neither to define the concepts clearly, nor to present any scientific method of calculation. They proceed on the basis of certain uncertain and unjustifiable norms, whose worth has been evaluated in Chapter five.

MAIN CONTRIBUTIONS

0Y2 The following few pages have more than one contribution to offer. Chapter one deals with the concepts of underemployment and distinguishes three forms of underemployment on the lines of an article ''Underemployment in Asia'' by Chiang Hsieh, published in International Labour Review, June 1952. These are :- (a) Visible underemployment, (b) Invisible underemployment, (c) Potential underemployment. Then It proceeds on a rigorous definition of Chronic and seasonal contents of various forms of underemployment.

0.3 In chapter two, the actual number of male and female workers and boy and girl workers have been estimated, on the basis of figures of 1951 census and Goverrment sponsored rural labour enquiry.

0.4 In chapters two and three land and labour utilisation have been discussed, the former on the basis of Census Report,Vol. II and crop and season reports and the latter mainly on the basis of NSS Data.

0.5 Visible underemployment has been defined as the difference of

the amount of labour-time which the labour force of agricultural industry is able to supply and the actual amount of labour-time worked by it in any given year. Visible agricultural under-employment amounts to about 27 per cent as shown in chapter V

0.5 Whatever the magnitude of actual employment may be it may be further reduced by raising the intensity of work per hour, by improving the organisation of work and division of labour and by introducing simple labour-saving devices requiring little or no net addition of capital outlay, without reducing total agricultural output. The proportion of agricultural labour-force which could be released indicates the degree of invisible underemployment , prevailing in the community in question. This has been worked out in chapter six where it has been found that the extent of invisible underemployment is about 9 per cent when only holdings of 10 or more acres are considered, and 25 per cent when all holdings are cultivated on cooperative basis under improved techniques. This attempt is the first of its kind and the writer has not come across any source which has estimated invisible underemployment scientifically in agricultural industry.

0.6 The term potential underemployment has been used to describe the amount of labour which might be released from the land without reducing total output by more fundamental changes in methods of production than those envisaged above-- by changing the method of cultivation, by increasing the substitution of capital for labour and by enlarging the size of holdings.. This form of under-employment is difficult to assess. Nevertheless efforts have been made to give some rough estimates. It has been discovered in

chapter seven that if the minimum size of holdings is raised to 7 acres, there will take place a release of 28 per cent of labour power. But if the farming is power-mechanised, the release of labour-power that will occur will be of the order of 60 to 80 per cent. This is again something which has not been attempted earlier.

0.7 Chapter eight discusses the seasonal and chronic content of various forms of underemployment. The minimum proportion of underemployment that prevails in agricultural industry in any period or even a day of the year accounts for the degree of chronic underemployment. The rest represents the seasonal. It has been observed in this chapter that there does not prevail chronic visible underemployment as such; because at seasonal peak of harvesting and transplanting, all available labour-power including that immigrated is employed. Hence all visible underemployment is of the seasonal type. The chronic element in invisible underemployment is likely to be 35 to 40 per cent, the rest being seasonal. In potential underemployment, seasonal variation would be greatly reduced, to about 20 per cent and 80 to 100 per cent of the potential underemployment would be relegated to chronic type.

0.8 In chapter nine visible underempoyment in Indian Union has been estimated on assumptions slightly different from those utilised for Uttar Pradesh. The visible agricultural underemployment in India in 1950-51 was 39.17 per cent on the assumption that a male worker works for 350 days per year and 31.18 per cent on the assumption that he works for only 300 days in a year.

0.9 The result obtained may be summarised as follows:-

Form of agricultural underemployment	Region	Per centage under employment	Year
Visible	U.P.	26.66	1950-51
''	U.P. (including Himalayan region)	27.46	''
Chronic Visible	U.P.		''
Seasonal visible	U.P.	26.66	''
Invisible			
(a) Improved techniques applied to holdings > or = to 10 ACRES		9.99	''
(b) Improved techniques applied to all holdings		25.68	''
Chronic vissible	U.P. (in holdings > or= to 10 acres)	3.7	''
''	U.P. (in all holdings)	9.0	''
Seasonal invisible	U.P.	6.29	''
(a) When improved techniques are applied to holdings of 10 or more acres		16.68	''
(b) When improved techniques are applied to all holdings			
Potential	U.P. (after creation of holdings > 7 acres)	28.00	
''	U.P. (power farming)	60-80	
Chronic Potential	''	60-80	
Seasonal Potential	''		

0.10 Chapter X has been devoted to a discussion of possible absorption in agriculture and the following rough estimates have been arrived at.

Source of employment	Amount of additional employment (in no. of workers)
1. Land reclamation	1,550,000
2. Double cropping	1,400,000
3. Mixed farming	
(a) improved techniques being applied to holding to 10 acres or more	(800,000)
(b) After creation of minimum holdings of 10 acres	2,000,000
4. Intensive cultivation	1,300,000
5. Establishment of demonstration centres	119,000
6. Establishment of veterinary houses	59,000
	7,228,000
	(6,428,000)

0.11 Thus about 6 to 7 million jobs can be created in agriculture by expanding and intensifying agriculture. This covers visible and invisible underemployment existing in 1950-51. But as population and so the number of potential workers is increasing rapidly, after 10 or 15 years, the increase in population may outstrip the increase in the number of agricultural jobs. The agricultural development shall, however, be accompanied by the development of secondry and tertiary industries, viz. the development of cottage and mechanised industries and the development of transport etc. which may absorb surplus agricultural labour.

0.12 The present work contributes to the understanding of the exact nature of agricultural underemployment, in its various forms. It does not only show the magnitude of surplus labour power under the existing conditions of production but also it tries to estimate the

magnitude of underemployment when the following changes are ushered in agriculture.

(1) Non-power implements that do not involve net additional outlay
   (a) When the size of holding remains intact and the individual farmer cultivates independently
   (b) When the farmers cultivate on cooperative basis on combined holdings of not less than 10 acres.

(2) When power-farming is introduced involving net additonal outlay.

0.13 The various forms of underemployment have then been divided into their chronic and seasonal components. All these attempts are novel in cha-racter and the results obtained are of great importance to the economic planning of the State.

ACKNOWLEDGEMENTS.

0.14 I have to acknowledge guidance and assistance from the following:-

(1) Prof. P.C. Mahalanobis F.R.S. of Indian Statistical Institute who offered guidance in the initial stages of the present work, and permitted to utilise N.S.S. data.

(2) Dr. R.M. Goodwin of Cambridge University who advised me on the lay-out of the thesis and gave valuable suggestions.

(3) Prof. Charles Battelheim of Paris University who advised me in the course of chapter five and six and suggested some improvements in chapter six. Some of my findings were incorporated in his papers on long term planning in India.

(4) Mr. J.K. Pande, Director of the Department of Economics and Statistics Government of U.P. who supplied Employment and Unemployment data for chapter eight.

(5) Dr. Gulathi of Baroda University who read chapter six and gave valuable suggestions.

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MAPS

Chapter One

FORMS OF UNDER-EMPLOYMENT

1.0 A worker is unemployed if he does not find any work to do during a certain period. The proportion of all such workers represents the extent of unemployment in a community. There may be, however, a number of workers who do not remain totally unemployed throughout the period but are sporadically employed for some days and/or on all days but for less than the full working hours. These workers are underemployed. When there are a considerable number of un- or underemployed persons in a community, the whole community is underemployed.

TYPES OF UNDEREMPLOYMENT

1.1 A worker is underemployed if he does less work than what he can normally do per day, so that his mental and physical capabilities remain partially unemployed. This occurs when a worker works for less than normal working hours or if he is engaged for the whole of working hours or more, the intensity of his work is so low, that his mental and physical capabilities are not optimally utilised. For example, if a worker finds work for two or three hours per day instead of eight hours and/or for lesser number of days than the total number of working days during the period he is underemployed and such a form of underemployment is called visible underemployment.

1.2 Another type of underemployment which is not clearly apparant occurs when the number of working hours or days are not smaller but the intensity of work is lower than the optimum.

The worker may remain engaged for the full normal working hours, but on account of the low intensity of work the amount of work done by him is smaller than what he can do. For example, at a station there may be too many hawkers so that the work done by each of them is less than what he could do if the number of their fellow workers were smaller. So long this excess of workers exists at the station the work done per worker shall be smaller and the work done by all the workers shall remain the same if a part of the labour force is transferred from the station to somewhere else. All such hawkers who can thus be released from the station are really unemployed, although it does not appear so. This type of under-employment is called invisible underemployment.

1.3 Invisible underemployment presents itself in yet another and more important form. A worker may be doing less work than his normal not because of relative scarcity or intermittent character of work, but because of the fact that the method of work which he adopts is less productive, viz.,,the implements which he is using may be slow in action or defective in other ways and the system and timing of work may be wasteful of labour-time. If the existing techniques and implements were replaced by improved ones, the worker may do more work than what he at present is doing, and thus a given amount of work may be done in a lesser number of working hours. The proportion of labour-hours that are released on account of a worker's using improved techniques and implements, which cost near about the same as the existing ones, in performing a given amount of work, measures invisible underemployment.

1.4 The cost of improved techniques of production may, in most cases, be appreciably higher than that of the existing ones, so that their introduction causes a material change in the capital-output ratio. The substitution of such implements may take long to be brought about and hence the surplus of labour-time resulting therefrom may be designated as 'potential underemployment'.

UNDEREMPLOYMENT IN AN INDUSTRY

1.5 The analysis of various forms of underemployment with reference to a particular individual discussed above, may be easily extended to cover all the workers in an industry. Such an analysis was attempted first in an article published in the International Labour Review.[1]

1.6 There is underemployment in an industry when the actual amount of work done by the total working force is smaller than the same number of workers are able to do without any deterioration of their mental and physical capabilities. The workers will do smaller amount of work than what they can do due mainly to the following three reasons.

1.7 Firstly, the workers may not be engaged on all working days and /or they are not engaged for the full normal working hours. They would do greater amount of work if they were engaged regularly on all working days and for the full working hours. The proportion of labour hours for which an industry does not provide jobs to its workers measures visible underemployment in the industry.

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1. 'International Labour Review', June 1952; ''Underemployment in Asia'' by Chiang Hsieh, pp. 7o6.

1.8 Secondly, even if the workers may be engaged throughout the period, on all working days and for the full working hours they may be doing lesser amount of work than what they can do. This happens when the workers are not utilising improved techniques that are equally costly as the existing ones, but which might enable them to perform a given amount of work in lesser number of work-hours. The proportion of excess labour time that would be released on the adoption of improved techniques without involving any substantial change in the capital-output ratio measures invisible underemployment in the industry.

1.9 Finally, the amount of work done in an industry can be greatly increased by introducing capital intensive techniques of production. This involves a change in the capital-output ratio that can be brought about after the industray has undergone a structural change. This will take a considerably long period and hence the release of surplus labour-power that would result from the introduction of techniques that cause a substantial change in the capital-output ratio represents potential underemployment.

AGRICULTURAL UNDEREMPLOYMENT

1.10 The problems of general unemployment and of localised industrial unemployment are mainly problems of advanced industrial countries. In the underdeveloped countries the predominant form of economic activity is agriculture, in which the level of employment is relatively stable. There are at least two reasons for this.

1.11 Firstly, in agriculture, adjustments to short run fluctuations in demand, are mainly made through changes in prices and income rather than by variations in production and employment. Secondly, in the majority of under-developed countries farming is largely a family enterprise run by members of the household with little hired labour. To the extent that this form of farm organisation prevails, unemployment in the sense of being out of a job can hardly arise even when output declines.

1.12 Thus the basic characteristic of employment situation in India and other under-developed countries is that although most of the working population is engaged in productive pursuits, the total amount of work done measured in man-hours or man-days is far below the total working capacity of the entire population. ''In contrast to the situation in the advanced industrial countries, the problem is one of underemployment rather than mass-unemployment, it is primarily agricultural rather than industrial, the phenomenon is chronic rather than cyclical, and, moreover, the incidence of underemployment spreads widely over the bulk of the population instead of being concentrated among a relatively limited number of workers. To remove such underemployment, the countries concerned will have to alter their economic structure, to revolutionise their techniques of production and, above all, to achieve a suffiSiently rapid increase in capital accumulation to counteract the depressing effects of rapidly growing population.''[2]

2.'Action Against Unemployment' International Labour Office, Geneva, 1950, pp. 128.

TECHNIQUE OF MEASURING VISIBLE UNDEREMPLOYMENT

1.13 If E represents the actual amount of labour-time for which the labour force is gainfully engaged, W the amount of labour-time which the labour-force is willing and able to supply, then the degree of visible underemployment U is the difference of supply of labour-time and the total labour-time worked divided by the total supply of labour-time,

$$U = \frac{W-E}{W} = 1 - \frac{E}{W} .$$

1:14 E includes all labour-time worked whether the work was performed for a full day or part of day, regularly or irregularly. Thus U covers (a) workers who are wholly out of work, and workers who are working only part time and/or sporadically. This technique of measuring visible under-employment requires the estimation of two factors, W and E, i.e., the total amount of labour-time supplied or available and total amount of labour-time worked.

1.15 The potential amount of labour-time available in a community can be measured in terms of mandays per year. There are a number of factors that determine the magnitude of available labour. They can be enumerated as follows:-

(1) The size of the population,

(2) The proportion of the population which is of working age,

(3) The proportion of females to males of working age in the population,

(4) The proportion of males of working age not available for productive employment elsewhere during parts of

the year, etc.

(5) The proportion of females of working age not available for productive employment in the region because of illness, absence for employment elsewhere during parts of the year, home duties etc.

(6) Potential number of working days per worker per year.

(7) Potential number of working hours per worker per day.

1.16 Thus it is not the total population that determines the amount of labour supplied. The amount of potential labour supply depends upon a number of factors such as, age composition, sex-ratio, condition of health, social customs and practices, migratory charater of labour force etc. 'The number of working hours per day and working days per year to be used for estimating the potential amount of labour-time is the number which could be worked without damage to health and with due observance of local customs and socially accepted habits regarding breaks for meals, recreation, days of rest, festivals and so forth'.[3]

1.17 The method of estimating the total labour-time available adopted here covers all labour-time that the community can supply. It does not consider the will of the labourers to offer their labour at the current rates of remuneration, the problem of individual willingness to work at prevailing rates of remuneration is purely subjective and in practice it is impossible to have any reliable estimates regarding this. 'Even in countries where there exists a highly developed labour market with a comprehensive system of employment exchanges and positive

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3. International Labour Review, June 1952; 'Underemployment in Asia' by Chiang Hsieh pp. 706.

inducements (such as unemployment benefits) for unemployed and partially employed workers to register at such exchanges, it is in practice difficult to determine accurately the amount of labour-time which workers are willing to supply. In the conditions prevailing in the Asian countries, no adequate and reliable test of willingness is available for use in field investigation'.[4] For reasons given above, no attempt will be made here to determine the willingness of workers.

1.18 After having made a reasonable estimate of the potential aggregate labour-time, the next step would be to investigate the extent of time that is actually spent by the community in productive activity. The whole community can be classified according to occupational distribution. To estimate the total number of labour days worked in a certain occupation or industry per year, there are two methods which can be adopted.

1.19 According to one method, a detailed information about workers' time-disposal in the industry should be collected, and all the labour-time utilised in that industry be added up. This method appears very simple, but it is inapplicable to unorganised industries like agriculture where no record of labour-time is either entered or maintained. Hence this direct method of finding out the total number of labour-days worked in agriculture where most of the work is performed by domestic labour without any regular timing of work is not helpful at all.

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4. Ibid, pp. 706.

1.2o The other method of estimating total labour-time utilised in a certain industry per year is to multiply the average amount of labour-time needed to perform one unit of work(or to produce one unit of output) by the total number of work-units completed (or the total number of units of output produced) in the year. Statistics of total acreage under various crops are published district-wise in the Abstract of Agricultural Statistics issued by the Economic and Statistical Adviser, Ministry of Food and Agriculture, Government of India; and data regarding labour-time per acre for raising various crops may be collected from the National Sample Survey of India and also from some public and private agricultural farms. Labour requirements per acre, however, do not vary only with the kind of crops but also with the quality of land, climatic conditions, methods of cultivation, ratio of animal labour and mechanical power to human labour used, the layout of farms, the availability of working capital, and the size distributions of holdings etc.

1.2p In order to account for these variations, there are two methods that can be adopted. Firstly, the state should be divided into such regions as have uniform natural and climatic conditions, the same pattern of distribution of holding sizes and farming practices, and then average number of labour-days utilised for producing each crop per acre may be estimated for such divisions separately. Secondly, unbiased selection of agricultural households may be made from all parts of the state and average number of labour-days utilised in growing various crops per acre may be ascertained. The first method is difficult

to follow. For the division of the State into such parts as have uniform natural and climatic conditions as well as uniform farming practices and distribution of holdings, is not possible without detailed geographical survey of the whole State. Even then it shall be observed that in a division, having more or less uniform natural conditions, there may prevail different farming practices and manland ratios, requiring varying amount of capital outlay. Hence this method cannot be conveniently adopted.

1.22 The other method is more convenient. The National Sample Survey of India conducted by the Finance Ministry, Government of India collects data regarding labour-days utilised in producing various crops by agricultural households randomly selected from all parts of the State. Hence the difference of natural conditions, degree of utilisation of animal power and capital, size of holdings and farming practices etc. shall be reflected in the average number of labour-days for growing a crop per acre for the whole of Uttar Pradesh.

INVISIBLE UNDER-EMPLOYMENT

1.23 It is perhaps to the credit of Mrs. Joan Robinson who first gave expression to what she calls disguised unemployment. She points out, ''that in a society in which there is no regular system of unemployment benefit, and in which poor relief is either non-existent or less 'eligible' than almost any alternative short of suicide, a man who is thrown out of work must scratch up living somehow or other by means of

his own efforts.''[5] These persons take up some other work where their productiveity is less, but they do not figure in the list of the unemployed. ''Thus a decline in demand for product of the general run of industries leads to a diversion of labour from occupations in which productivity is higher to other where it is lower. The cause of this diversion, a decline in effective demand is exactly the same as the cause of unemployment in the ordinary sense, and it is natural to describe the adoption of inferior occupations by dismissed workers 'disguised unemployment' ''.[6] Such form of unemployment is widely prevalent in underdeveloped economies. But the main cause of such unemployment is not what has been pointed out by Mrs. Robinson, which is more relevant in the cse of industrialised communities, where such unemployment results mainly due to reduction in effective demand. ''In an underdeveloped and agrarian,economy with little capital equipment and a somewhat low technical knowledge like India, on the other hand, disguised unemployment is a normal feature of the economy''.[7] Mrs. Robinson has applied the term to wage-labour undertaking less productive work. But there may be too many possibilities for workers getting less productive work so that, in practice, it would be very difficult to make even a rough estimate of the degree of such unemployment. In fact, it is practically impossible to ascertain how far the capacities of a worker engaged in a job are over or underutilised.

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5. Mrs. Joan Robinson: Essays in the Theory of Employment, Macmillan and Co. Limited St. Martin's Street, London 1937 pp. 83.
6. Ibid pp. 84
7. V.K.R.V.Rao: Indian Economic Review, Vol. I, No. 1, Feb. 1952; pp. 62.

1.24 The U.N. Committee of Experts on 'Measures for the Economic Development of under-developed countries'have given the following exclusive definition of under-employment. ''The disguised unemployed are those persons who work on their own account and who are so numerous relatively to the resources with which they work, that if a number of them were withdrawn for work in other sectors of the economy the total output of the sector from which they were withdrawn sould not be diminished even though no significant reorganisation occurred in this sector, and no significant substitution of capital''.[8]

1.25 According to the U.N. Experts Committee, there exists invisible disguised un- or under-employment in a sector or industry, if a number of workers engaged in that industry are transferred to some other industry without causing any reduction in the total amount of production. The number of such workers who do not add to the total net volume of production are invisibly unemployed in the industry. Mrs. Robinson does not consider a sector or industry as a whole, but she relates her definition to the productive capacity of a worker and his unutilised capacity represents, according to her, disguised underemployment. If we add up all such underemployment in an industry, it will amount to, perhaps, the same degree of underemployment as may be estimated according to the U.N. Committee's definition.

1.26 In this dissertation, the degree of non-visible underemployment shall be determined by measuring the proportion of labour time spent in agricultural activity but without

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8. Measures for the Economic Development of Underdeveloped Countries: Report by a group of Experts appointed by the Secretary General of the United Nations; U.N. Department of Economic Affairs, New York. May 1951. Pp. 7.

contributing anything to total agricultural product. In other words, we shall measure the proportion of labour-time utilised in agriculture which can be released from land without reducing total agricultural output. This can be done in a number of ways by raising the intensity of work per hour. Firstly labour time can be saved by introducing simple labour saving devices requiring no addition of capital outlay, no change in the institutional frame-work and no alteration in the size of holdings. Secondly, labour-time can be released by improving the organisation of work and the division of labour. These measurements, however, cannot be made to any high degree of exactitude with such loose variables as mentioned above.

POTENTIAL UNDEREMPLOYMENT.

1.27 Invisible underemployment measures the situation where due to the use of less efficient capital equipment or due to lack of better organisation, work efficiency of a number of workers is almost nil. 'The term ''Potential underemployment'' may be used to describe the amount of labour which might be released from the land without reducing total output by more fundamental change in methods of production than those envisaged above, i.e., by changing the method of cultivation, by increasing substitution of capital for labour and by enlarging the size of land-holdings'.[9]

1.28 The amount of potential underemployment does not lend itself easily to quantitative assessment. But it is quite obvious that in the under-developed areas with primitive methods of production and small fragmented holdings, there exists a large

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9. I.L.O. 'Unemployment in Asia' June 1952 by Chiang Hsieh PP. 7o6.

degree of potential underemployment. The basic problem of all the predominantly agricultural countries in the underdeveloped areas is to increase the agricultural productivity by releasing the potentially underemployed people through introduction of more efficient agricultural techniques by using more capital for human labour and by enlarging the size of farms. Potential under-employment shall measure in this dissertation the release of labour-power mainly on the basis of two criteria. Firstly, the saving of labour-time resulting from enlarging the size of holdings. Secondly, the saving of labour-time resulting from the introduction of heavy machines that are likely to change the capital-output ratio. Naturally, these changes will take long to be introduced and the eradication potential underemployment is a long-term objective.

SEASONAL AND CHRONIC ASPECTS OF UNDEREMPLOYMENT

1.29 In agriculture, labour-requirements are not of the same magnitude all the year round. In peak periods very little of the labour-time supplied remains unemployed, while in off-seasons a sizeable amount of labour-time supplied remains out of demand. If a certain portion of potential labour-time is not utilised even in peak period, then it represents chronic visible under-employment. The proportion of the rest of the unutilised labour represents seasonal visible underemployment. Thus the visible underemployment is not entirely of seasonal character; the community also suffers from chronic agricultural underemployment, in the sense that even at the peak of agricultural activity, the potential amount of labour-time still exceeds the amount actually utilised. The relationship between the two components is, by the following symbolic expressions, represented.

1.3o Let us divide the whole year in n equal periods out of which m are peak periods. Let us further assume that the amount of labour-time worked in each peak period (or average thereof) is p. Then if W represents the total amount of labour-time available per year,

$$\text{Chronic Underemployment } Uc = \frac{W-np}{W}$$

$$\text{and Seasonal Underemployemt } Us = U-Uc$$

$$= \frac{W-E}{W} - \frac{W-np}{W}$$

$$= \frac{np-E}{W},$$

where E represents total employment, U visibile underemployment with suffixes c and s for chronic and seasonal respectively. In other words, seasonal underemployment is the proportion of the difference of average employment in the peak periods multiplied by the number of periods and the total employment in the year to the total labour power available in that year. If during the peak periods all the labour-time is employed, i.e., the total labour-time supplied is equivalent to that demanded then there is no visible chronic under-employment and correspondingly, Uc will be zero. And if during the peak period labour time demanded is greater than that supplied, so that the workers are required to do over-time work, then Uc will be negative. In the first case, total unemployment will be attributed to seasonal fluctuations and in the second case, the visible seasonal unemployment accounts for more than the visible total under-employment.

1.31 The above illustration is based on a gross over-simplification in respect of the determination of the number and duration of the periods. Agricultural seasons are not of equal durations, nor are there any fixed dates that divide offs from the peak seasons. The level of employment rises slowly as the off season comes to an end and the peak season begins and there are severe fluctuations even during the peak seasons. The intensity of each peak period differs from year to year according to the frequency, distribution and the intensity of the rainfall. Hence, in practice, it is very difficult to determine the duration of peak periods and the intensity of employment therein. Any estimate will involve a good degree of arbitrary assumptions.

1.32 The intensity of peak periods of the whole agricultural community is affected by the coincidence and overlapping of peaks of various individual crops. If the different crops happen to be so combined that their respective seasonal variations do not coincide but occur in succession, the fluctuations in the aggregate labour-requirements may be fairly moderate, even though each individual crop is highly seasonal. If on the other hand, the seasonal peaks of different crops occur more or less at the same time, the fluctuations in aggregate labour-requirements over the year are likely to be very pronounced.

INVISIBLE CHRONIC UNDEREMPLOYMENT

1.33 Chronic visible underemployment is the proportion of the unutilised labour-time that is available in an agricultural community even during the peak seasons. This proportion will be greatly raised if the introduction of new techniques reduce the amount of labour-time required during such peaks as ploughing, harvesting etc. The proportion of labour-time that becomes redundant throughout the year due to the introduction of techniques that are applied for the measurement of invisible underemployment may be called invisible chronic underemployment. And the proportion of labour-time that will become redudant throughout the year due to the introduction of structural changes such as heavy mechanisation or enlarging of the size of holdings, shall be called potential chronic underemployment.

1.34 In symbolic form, if pi represents the labour-time that will be neeed during the peaks after the introduction of improved implements and other techniques without increasing capital intensity then,

Invisible Chronic Underemployment

$$Uci = \frac{n(p-pi)}{W}$$

where p is the average amount of labour-time utilised during the peak seasons before the introduction of improved techniques.

POTENTIAL CHRONIC UNDEREMPLOYMENT

1.35 Similarly Potential Chronic Underemployment

$$Uc\text{-}pot = \frac{n(p-p_{pot})}{W}$$

where p and p_{pot} denote the average amount of labourtime utilised before and after the introducion of heavy mechanisation and other structural changes in land-holdings respectively.

1.36 Apart from normal visible underemployment that prevails in the agricultural communities, there recurring large scale disturbances in agricultural activity, due to severe drought, widespread floods and other natural calamities. The occurrence of these phenomena results into mass employment and countless peasant families are thrown out of employment. In such circumstances, situations change into one ~~of one~~ of acute ~~of~~ mass unemployment which call for large scale emergency measures.

Chapter Two

AGRICULTURAL WORKERS IN UTTAR PRADESH

LOCATION, AREA AND NATURAL DIVISIONS

2.0 Uttar Pradesh, formerly known as Uniter Provinces of Agra and Oudh,[1] lies between north latitude 23° 52' (Mirzapur) and 31° 18' (Tehri-Garhwal) and east latitude 77° 3' (Muzaffar-nagar) and 84° 39' (Ballia). Its boundary in the north runs with that of Nepal and Tibet in the Himalayas; on the west and south-west are the States of Himachal Pradesh, Punjab, Delhi and Rajasthan; on the south, the States of Vindhya Pradesh, Madhya Bharat and Madhya Pradesh; and on the east the State of Bihar.

2.1 The total area is 113,409 sq. miles which is 886 sq. miles more than the area of United Provinces and the three princely State in 1941. An addition of 56 sq. miles is accounted for by revised calculations of area made by Surveyor General of India and the remaining 830 sq. miles are the net result of transfer of enclaves. Uttar Pradesh is divided into 51 districts which are grouped into revenue divisions. The revenue divisions and districts are not homogeneous in respect of natural conditions affecting the growth of population. For analytical study of census data districts have been grouped together into natural divisions on the basis of similarity of physical features, soil and rainfall. Some districts falling into two different natural divisions are included deliberately in which its greater portion falls. Physiographically Uttar Pradesh comprises of 3 natural regions. The first is

1. Census of India 1951, Volume II, UTTAR PRADESH. Part I-A-Report pp. 1.

formed of the mighty Himalayan mountain that ranges along the north; the second is the alluvial plain region of the Yamna and the Ganga and their tributaries; and the third is Peninsular Hill and Plateau regions lying to the South of the plains covering the trans-Yamuna tract. These natural regions are further divided into natural sub-regions and again into natural divisions. There are five natural divisions in Uttar Pradesh.[2]

Natural Divisions		Districts	Revenue Divisions
HIMALAYAN	(1	Garhwal	Kumaun
	(2	Tehri-Garhwal	-do-
	(3	Naini Tal	-do-
	(4	Almora	-do-
	(5	Dehradun	Meerut
EAST PLAIN	(1	Gorakhpur	Gorakhpur
	(2	Deoria	-do-
	(3	Basti	-do-
	(4	Gonda	Faizabad
	(5	Bahraich	-do-
	(6	Banaras	Banaras
	(7	Jaunpur	-do-
	(8	Ghazipur	-do-
	(9	Ballia	-do-
	(1o	Azamgarh	Gorakhpur
	(1	Kanpur	Allahabad
	(2	Fatehpur	-do-
	(3	Allahabad	-do-
	(4	Lucknow	Lucknow

2. Ibid pp. 4.

Natural Divisions	Districts	Revenue Divisions
CENTRAL PLAIN	(5 Unnao	Lucknow
	(6 Raibareilly	-do-
	(7 Sitapur	-do-
	(8 Hardoi	-do-
	(9 Faizabad	Faizabad
	(1o Sultanpur	-do-
	(11 Pratapgarh	-do-
	(12 Barabanki	-do-
WEST PLAIN	(1 Saharanpur	Meerut
	(2 Bareilly	Rohilkhand
	(3 Bijnor	-do-
	(4 Pilibhit	-do-
	(5 Rampur	-do-
	(6 Kheri	Lucknow
	(7 Muzaffarnagar	Meerut
	(8 Meerut	-do-
	(9 Bulandshahar	-do-
	(1o Aligarh	Agra
	(111Mathura	-do-
	(12 Agra	-do-
	(13 Mainpuri	-do-
	(14 Etah	-do-
	(15 Badaun	Rohilkhand
	(16 Moradabad	-do-
	(17 Shahjahanpur	-do-
	(18 Etawah	Allahabad
	(19 Farukhabad	-do-

Natural Divisions		Districts	Revenue Divisions
HILLS AND PLATEAU	(1	Jhansi	Jhansi
	(2	Jalaun	-do-
	(3	Hamirpur	-do-
	(4	Banda	-do-
	(5	Mirzapur	Banaras

2.2 [The area and population of these natural divisions] is shown below:[3]

Natural Divisions	Area	Population	Percentage of State AREA	Percentage of State POPULATION
Uttar Pradesh	113,4o9	63,215,742	1oo	1oo
1.Himalayan	19,471	2,521,987	17.2	4.o
2 East Plain	21,o52	17,886,8o2	18.6	28.3
3 Central ''	22,5o4	16,129,89o	19.8	25.5
4.West Plain	34,637	22,771,252	3o.5	36.o
5 Hills and Plateau	15,745	3,9o5,811	13.9	6.2

DENSITY OF POPULATION

2.3 The enumerated population of Uttar Pradesh on March 1, 1951 was 63,215,742 while the total area of the State is 113,4o9 sq. miles. The absolute or crude density calculates to 557 person per square mile. It stands first in population in India though fourth in area. In point of density it stands fifth with a figure just double of that of India. Among the major States, only West Bengal (8o6) and Bihar (572) have a higher density than U.P. Its population represents 18 per cent or about one-fifth of the population of India but occupies only

3. Ibid, pp. 5.

9 per cent of the total area of the country.

AGRICULTURAL WORKERS IN UP

2.4 In the 1951 census, the whole population has been divided into eight livelihood classes, four of which are of agricultural category and four of non-agricultural category. The agricultural classes are as follows:[4]

(i) Cultivators of land wholly or mainly owned; and their dependents,

(ii) Cultivators of land wholly or mainly unowned; and their dependents,

(iii) Cultivating labourers; and their dependents,

(iv) Non-cultivating owners of land, agricultural rent-receivers; and their dependents;

The non-agricultural classes are as follows:[5]

(v) Production other than cultivation,

(vi) Commerce,

(vii) Transport,

(viii) Other services and miscellaneous services.

2.5 Agriculture is the oldest economic activity in the world and even to-day, the largest, The majority of the population of the world, probably nearly two-third of the total are dependant upon it for living. India is predominantly an agricultural country and inspite of the recent efforts at industrialisation it continues to be predominantly agricultural. The state of Uttar Pradesh is one of the important agricultural states of India.

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4. Ibid pp. 2oo
5. Ibid pp. 273

As many as 469 lakhs out of 632 lakhs or 74.2 per cent of the total population of the state belong to agricultural classes.[6]

2.6 Among the natural divisions of U.P., the East Plain has the highest ratio of agricultural population (82.8 per cent) and the West Plain the lowest (66.o per cent), while the proportion of three divisions approximate to the average ratio of the state. The table below gives the distribution of 1,ooo persons by agricultural and non-agricultural classes by natural divisions.[7]

Natural Divisions	Agricultural Classes	Non-agrl. Classes
U.P.	742	258
Himalayan	788	212
East Plain	828	172
Central Plain	752	248
West Plain	66o	34o
Hills and Plateau	753	247

2.7 The Census Report[8] divides all persons in three categories according to Economic Status. 1. Self-supporting persons 2. Earning dependants, 3, Non-earning dependants. A self-supporting person is one who is in receipt of an income and that income is sufficient at least for his own maintenance. To be self-supporting a person need not be able to support his family. All that is necessary is that he should be earning enough for his personal needs.

6. Ibid pp5 2o5.
7. Ibid pp. 2o6.
8. Ibid pp. 199.

2.8 Any one who is not a self supporting person is this sense is a dependant. A dependant may be either an earning dependant or a non-earning dependant. The test is whether he secures a regular (and not casual) income, even though it may be small. Such income may be in cash or kind, it may be by continuous or seasonal employment. When the income which he secured is not sufficient to support him that person is an earning dependant. A person who does not earn any income either in cash or kind is a non-earning dependant. Where two or more members of a family household jointly cultivate land and secure an income therefrom, each of them should be regarded as earning a part of the income. None of them, is, therefore, a non-earning dependant. Each of them should be classed as either a self-earning person or an earning dependant according to the share of income attributable to each.

2.9 This does not mean that every one who works is necessarily a self-supporting person or an earning dependant. Thus, for instance, a house-wife who cooks for the family, brings up the children or manages the household is doing very valuable work. Nevertheless, her economic status is that of non-earning dependant if she does not also earn an income, and should be recorded as such.[9] The table below gives the distribution of 1,000 persons of each agricultural class among self-supporting persons, earning and non-earning dependants.[10]

9. Ibid, pp.451.
10. Ibid, pp. 208.

Livelihood Class	Self-supporting person			Earning dependants			Non-earning dependants.		
	P	M	F	P	M	F	P	M	F
ALL CLASSES	297	27o	27	142	38	1o4	561	21o	351
IX	289	267	22	144	38	1o5	57o	212	358
IIX	3o5	277	28	169	42	127	526	2o7	319
III	366	3o2	64	143	32	111	491	194	297
IV	381	239	142	34	15	19	585	2o2	283

AGRICULTURAL WORKERS

2.1o The CR defines workers on the basis of earnings.[11] All those persons who earn through labour some regular income, however, insignificant are included in the category of workers. Thus all self-supporting persons and earning dependants of the first three categories of agricultural classes (i.e., excluding the IV class of rent receivers) are workers. Workers have been classified into two parts; Active workers and semi-active workers. Self-supporting persons having cultivation as the principal means of livelihood are classed as ' active workers'. The 'semi-active' workers consist of self-supporting persons of all classes other than cultivation having cultivation as their secondary means of livelihood. Cultivation includes all agricultural livelihood classes except class IV of non-cultivating owners of land and agricultural rent receivers.

2.11 Examining the distribution of the active and semi-active workers among the three cultivating classes in the state, it

11. Ibid, pp. 247.

would appear that as many as 82.5 per cent are cultivators of owned land, while employment as cultivating labourers accounts for 1o.1 per cent and cultivators of unowned land 7.4 per cent. Striking deviations from this pattern are to be found in the Himalayan and hills and Plateau. This is because of the fact, in the former region, there are small holdings and most of families cultivate themselves; hence the proportion of class I is higher. In Hills and Plateau, on the other hand, the holdings are larger, hence the proportion of class II and III is higher.

2.12 In Uttar Pradesh almost exactly three-fourth of the active population is engaged in agriculture and the production barely balances the requirements of the State. In U.S.A. only one-sixth of the active population is engaged in agriculture, the production is far in excess of the needs of total population and exports to other countries are possible. So also in Canada where only about a quarter of the active population work in agriculture. In.U.K. only 6 per cent carry on agriculture and are able to produce about half the food of the people. In Japan only about half the active population are agriculturists and produce about 8o per cent of the food of the country. These figures point to the different degrees of industrialisation of the various countries as also the different degrees of development of agricultural production. The following table gives the distribution of 1,ooo persons of active population by agricultural and non-agricultural classes in selected countries.[12]

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12. Source: United Nations, Statistical Year Book, 1949-5o.

Name of Country	Year	Agricltural classes	Non-agricultural classes
U. S. A.	194o	176	824
Canada	1941	263	737
Mexico	194o	654	345
Brazil	194o	674	326
U.K.	1931	6o	94o
France	1946	365	635
Rumania	193o	787	213
Egypt	1937	7o7	293
Japan	1947	526	474
Uttar Pradesh	1951	754	246

ADEQUACY OF CR'S ESTIMATE OF AGRICULTURAL WORKERS

2.13 The CR employs a very crude method for estimating the total number of active workers, on the basis of an arbitrary conversion ratio for semi-active workers versus active workers. '' We will now proceed to consider the man-power units (effectively active workers) engaged in cultivation in the state and natural divisions. If an active worker is treated as one unit we will have to convert the semi-active workers into the active workers units. For purposes of calculation, let us assume that an earning dependant is equivalent to one-third of an active worker''. On this basis, the following number of effectively active workers have been calculated in each natural division, with their corresponding area sown (plus current fallows).[13]

13. Ibid, pp. 248.

Natural Divisions	Effectively active workers in cultivation	Area Sown+ current fallow	Area per active worker
U.P.	15,824,747	42,771,024	2.70
Himalayan	735,817	1,961,064	2.67
East Plain	5,112,438	10,047,652	1.97
Central Plain	4,116,190	9,606,205	2.33
West Plain	4,811,273	16,026,427	3.33
Hills and Plateau	1,049,029	5,129,676	4.89

2.14 The number of agricultural workers as defined by CR is not very suitable for gauging the extent of various types of underemployment. The census included in the agricultural workers, persons of all ages who do some work more or less regularly (i.e. not casually) and earn some regular income. Thus a ten year old child may be included in workers but a person between 16 and 54 may be excluded, if he does not earn any income regularly, nothwithstanding the fact that he may be fit enough to undertake if some work is provided.

2.15 An earning dependent has been taken equivalent to 1/2 of an active worker. Considering in terms of wastage of human energy, this ratio appears to be untenable; because an earning dependent in the age-group of 15-54 is capable of doing as much work as a self-supporting person, an earning dependant of working age is as important as a self-supporting person, from the standpoint of underemployment. But a self-supporting person below 15 or above 54 who is not fully capable of undertaking agriculture tasks should not be included in the category of workers, even if he puts in some labour more or less regularly.

2.16 TheCR definition of agricultural worker does not distinguish between males and females. This is a serious lacuna , for the quantum of work done by a male will in all probability be much greater than that done by a female, as the latter are responsible also for household and material duties. Females, should, therefore not be treated at par with males as a female does proportionately lesser amount of agricultural work than a male per annum. A major portion of labour-time of female workers is devoted to the performance of monetarily nongainful household duties. Hence the labour-time supplied by a female is much lower than that by a male. The CR also does not make any adjustments for agricultural workers who have non-agricultural secondary occupations and non-agricultural workers who have agricultural occupations.

METHOD OF ASCERTAINING THE NUMBER OF AGRICULTURAL WORKERS

2.17 All the males between the age of 15 to 55 years will be regarded as full workers. This leaves out self-supporting persons and earning dependants outside this age-limit and included non-earning dependants inside it. This should be because we are not concerned with the earnings as such but with the capacity to work.

2.18 The CR gives the number of agricultural self-supporting persons who have non-agricultural activity as a secondary means of livelihood and that of non-agricultural self-supporting persons having agriculture as secondary means of livelihood. The census occupational classification rests upon the receipt of income. Our aim is to find out the labour-time that is available for agricultural occupations. If the agricultural and non-agricultural earnings were equal, it would be possible to cancel o

the number of agriculturists having non-agricultural activity as secondary occupations against non-agriculturists having agriculture as secondary means of occupation. Unfortunately this is not so. Though it is not possible to find any reliable source giving the general agricultural and non-agricultural earnings, Agricultural Labour Enquiry Report gives the agricultural and non-agricultural earning of agricultural labourers. Income per earner in an U.P. agricultural labour family in 1950-51 was Rs. 367/- and income per factory earner under the Payment of Wages Act (for 1950) in all industries was Rs. 880/-.[14] Thus the income of factory worker was double ~~than~~ that of an agricultural labourer. It means that if an agricultural worker, having non-agricultural secondary occupation, devotes more than 33 per cent. of his labour-time to non-agricultural occupation, his earnings from the non-agricultural sources would exceed those from agricultural sources, and he would no longer remain an agricultural worker, according to CR's definition. Hence all agricultural workers having a secondary means of occupation according to CR, utilise less than 33 per cent of their labour-time in non-agricultural pursuits, i.e., on an average abour 16 per cent. Applying the same reasoning to non-agricultural workers having an agricultural secondary means of livelihood, it is assumed that a non-agricultural worker can devote as high as 60 or 66 per cent of his labour-time to agriculture, without making agricultural incomes exceed the non-agricultural. Hence it is supposed here that a non-agricultural worker having an agricultural secondary occupation utilises at least about 30 per cent of his labour-time in agriculture

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14. ALE Vol. I- All India pp. 100 Statement 12.

THE ESTIMATED NUMBER OF MALE AGRICULTURAL WORKERS:-

2.19 The total number of persons in 1951, in each region according to the census was as follows:[15]

Divisions	Males and Females	Percentage of the State
U.P.	63,215,742	1oo.o
1. Himalayan	2,521,987	4.o
2. East Plain	17,886,8o2	28.3
3. Central Plain	16,129,89o	25.5
4. West Plain	22,771,252	36.o
5. Hills and Plateau	3,9o5,811	6.2

2.2o The percentage of persons in the first three livelihood classes which cover all the working force in agriculture according to the census 1951 is as follows[16]:

Divisions	Pereentage of population in agricultural classes			Total percentage
	I	II	III	I+II+III
U. P.	62,26	5.15	5.71	73.12
Himalayan	72.73	4.76	1.1o	78.59
East Plain	69.15	6.6o	6.48	82.23
Central Plain	63.28	5.64	4.93	73.85
West Plain	56.13	3.35	5.24	64.72
Hills and Plateau	55.5o	7.24	11.22	73.96

2.21 According to the above percentages, the total number of persons in the first three categories of agricultural classes are given in the following table:

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15. Census of India 1951, Uttar Pradesh Part I-A pp. 5.
16. Ibid pp. 95.

Divisions	Total number of persons of working Agricultural families
1. Himalayan	1,982,o3o
2. East Plain	14,7o8,317
3. Central Plain	11,911,924
4. West Plain	14,737,554
5. Hills and Plateau	2,888,738
U. P.	46,223,351

2.22 According to the census 1951, the percentage of persons of employable age (15-54) in the agricultural classes in the various regions was as follows:[17]

Division	Agricultural Classes	
	Males	Females
U.P.	27.55	25.o1
1. Himalayan	25.3o	27.9o
2. East Plain	25.75	25.64
3. Central Plain	27.88	24.91
4. West Plain	29.35	23.97
5. Hills and Plateau	27.57	25.66

2.23 The proportion of males of employable age (15-54) should be the principal factor determining the number of workers. According to the above proportions, the total number of workers in the employable age is given in the following table:

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17. Ibid pp. 377.

Divisions	Total No. of persons(in agriculture)	Males (15-54)	Females (15 - 54)
U. P.	46,223,351	12,734,533	11,56o,46o
1. Himalayan	1,982,o3o	5o1,453	522,986
2. East Plain	14,7o8,317	3,787,392	3,771,213
3. Central Plain	11,911,924	3,321,o44	2,967,26o
4. West Plain	14,737,554	4,325,472	3,532,592
5. Hills and Plateau	2,888,738	796,425	741,25o

2.24 The table below gives the number of self-supporting males of the first three agricultural livelihood classes who had non-agricultural occupation including the fourth category of agricultural classes, i.e., rent-receivers as their secondary means of livelihood and also the number of self-supporting males of non-agricultural classes and the IV agricultural class having agriculture as their secondary means of livelihood:[18]

Divisions	No. of Self-supporting mlaes of classes I-III having secondary occupation in IV-VIII classes.	No. of self-supporting males of classes IV-VIII having secondary occupation in I-III classes.
1. Himalayan	82,244	62,847
2. East Plain	531,686	119,369
3. Central Plain	385,352	87,671
4. West Plain	329,18o	95,299
5. Hills and Plateau	99,382	24,9o5

2.25 We can now make adjustments for the labour-time utilised by one group of workers in the other group of occupations and vice-versa. We will take 3o per cent of the non-agricultural self-

18. The table has been constructed on the basis of the data presented in the Census of India 1951, Vol. II, Uttar Pradesh Part II-Economic Tables, Secondary Means of Livelihood, pp. 75-161.

supporting males having agricultural secondary occupation and add it to the total number of agricultural workers and similarly we shall take 15 per cent of the agricultural self-supporting males having non-agricultural secondary occupation and deduct it from the total number of agricultural male workers.[19]

Divisions	15 per cent of agricultural male workers having non-agricultural secondary means of livelihood	30 per cent of non-agricultural male workers having agricultural means of livelihood as secondary occupation
1. Himalayan	13,159	18,854
2. East Plain	85,070	35,811
3. Central Plain	61,656	26,301
4. West Plain	52,669	28,590
5. Hills and Plateau	15,901	7,472

2.26 The table below gives the adjusted number of agricultural male workers by natural divisions:

Divisions	Male agricultural workers
1. Himalayan	507,148
2. East Plain	3,738,133
3. Central Plain	3,285,689
4. West Plain	4,301,393
5. Hills and Plateau	787,996

FEMALE AND CHILD WORKERS:

2.29 To estimate the number of female workers is a difficult problem.. They are responsible for all household duties and only a part of the females is engaged in gainful agricultural occupations. Their

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19. Secondary occupation of male earning dependants has been neglected.

participation in agricultural occupations is dependent on a number of factors social, cultural and religious, as well as on income level of families. Famales cannot perform all the operations in farming. But they can perfomm such functions as sowing, weeding, transplanting, reaping etc. very efficiently, and are expert in feeding the cattle.

2.28 Estimates of child labour are also very difficult to make. Some of the farming operations such as weeding, cattle-tending, watching etc,, can be easily performed by children, i.e., boys and girls of 9 or 1o to 15.

2.29 Some relevant information about female and child labour is contained in 'Rural Manpower and Occupational Structure'[2o] The following table gives the percentage of women, boys and girls that participated in gainful labour to total rural population. Women, boys and girls who participate in agriculture have been divided into Earners and Helpers.[21]

2o. 'Rural Man-power and Occupational Structure', Agricultural Labour Enquiry, Ministry of Labour 1955 pp. 16o.

21. Ibid pp. 155 (only relevant part of table 2 has been reproduced). Earners here does not correspond exactly to CR's self-supporting persons. Earners are all those who earn independent income whether it is sufficient to support them or not. Self-supporting persons are only thpse whose earnings are sufficient to support them. So helper also does not correspond with earning dependants. Helpers are all those who assist the head of the family, while earning dependants are those who earn some regular (not casual) income. Helpers will include all those who work only casually also. vide ibid pp. 16.

Zone	Earners			Helpers			Total population
	Women	Boys	Girls	Women	Boys	Girls	
1. Eastern	1.7	o.5	-	8.3	1.8	o.7	1oo
2. Central	2.o	o.2	o.o2	11.3	1.6	o.4	1oo
3. Western	1.o	o.3	-	4.5	1.3	o.3	1oo
4. Hill	1.5	o.4	-	22.o	o.5	o.9	1oo
5. Terai[22]	1.2	o.3	o.1	5.2	1.7	o.3	1oo
6. Southern	1.9	o.2	-	12.1	o.5	o.6	1oo

2.3o The table below gives the total agricultural population by natural divisions and the number of women, boys and girls workers (earners and helpers).

Divisions	Agricultural population	Women		Boys		Girls	
		per cent	Number	p.c.	Number	p.c.	Number
1. Himalayan	199256o	23.5	468252	.9	11933	.9	17933
2. East	14812966	1o.o	1481297	2.1	311o72	.7	1o3691
3. Central	12122251	13.3	1612259	1.8	2182o1	.42	5o913
4. West	15o2oo6o	5.5	8261o3	1.6	24o321	.3	45o6o
5. Hills+ Plateau	295129o	14.o	413181	.7	2o659	.6	177o8
U. P.	469o6o81	-	48o1o92	-	8o8186	-	2353o5

22. Terai Zone consists of the districts of Dheri, Gonda, Bahraich, Pilibhit, Dehradun and parts of Nainital. According to CR, Gonda and Bahraich fall in Eastern Division, Pilibhit in West Plain, and Dehradun and Nainital in Himalayan. As, here the Census classification has been followed, Terai Zone will not be taken into account. Southern zone corresponds to Hills and Plateau of CR and Hill Zone shall be taken for Himalayan.

Chapter three

LAND UTILISATION IN UTTAR PRADESH

MAN-LAND RATIO

3.o The total area of Uttar Pradesh is 113,4o9,749. The percentage distribution of area and population by natural divisions is given by the following table.[1]

Divisions	Area in (ooo) sq. miles	Population	Percentage of stat Area	Population
Uttar Pradesh	113,4o9	63,215,742	1oo	1oo
1. Himalayan	19,471	2,521,987	17.2	4.o
2. East Plain	21,o52	17,886,8o2	18.6	28.3
3. Central Plain	22,5o4	16,129,89o	19.8	25.5
4. West Plain	34,637	22,771,252	3o.5	36.o
5. Hills and Plateau	15,745	3,9o5,811	13.9	6.2

3.1 Uttar Pradesh is a predominantly an agricultural state. With exception of Uruguay, Uttar Pradesh has the highest proportion of cultivated to cultivable land, indicating that saturation point has already been reached in the matter of cultivation in this State.[2]

3.2 That there has not taken place any appreciable change in the proportion of cultivated area, is shown by the following table.[3]

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1. Census of India 1951, Volume II Uttar Pradesh Part I-A pp. 5.
2.
3. Ibid, pp.24o

Progress of net and gross cultivated area in the State, (excluding the Kumaon Hills and Former Princely States)

Year	Total area	Net cultivated area	Gross cultivated area	Percentage of total area	
				Net	Gross
1911	6o,88o,873	35,646,o36	44,49o,54o	58.55	73.o8
	(6o,617,1o5)[4]	(34,984,886)	(42,358,3o6)	(57.71)	(69.88)
1921	6o,797,o73	33,697,17o	39,741,315	55,43	65.37
	(6o,822,655)	(34,3o4,878)	(42,273,361)	(56.4o)	(69.4o)
1931	6o,577,516	34,913,617	43,o21,634	57.63	71.o2
	(6o,579,o29)	(34,288,37o)	(42,273,763)	(56.5o)	(69.76)
1941	6o,627,438	35,922,514	43,623,85o	59,25	71.85
	(6o,598,o96)	(35,669,788)	(44,18o,139)	(58.86)	(72.91)
1951	61,149,o75	37,965,247	46,815,889	62.o9	76.56
	(6o,6o1,413)	(37,144,725)	(46,32o,842)	(61.29)	(76.44)

3.3 The above table shows that the proportion of gross as well as net cultivated area to the total area has been gradually increasing since 1911, except for a steep fall during 1916-21 which can be easily assigned to the influenza epidemic. This increasing trend has been greatly accentuated since 1943, due obviously to war and scarcity conditions. The net area cultivated has registered a rise of about 3.58 per cent of the total area, over the last fifty years. Out of this 2.58 per cent has occurred in the last decade.

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4. Figures in brackets are the quinquenniad averages for the quinquennium ending the year.

3.4 Although there has taken place a steady progress in the area cultivated, it has been far exceeded by the increase in population. The following table gives the percentage variation in population and cultivated area of the State (excluding Kumaon Hills and former princely states), since 1911.[5]

Period	Population	Net area cultivated	Gross cultivated area
1911-2o	3.1	1.9	o.3
1921-3o	6.6	o.o5	o.1
1931-4o	13.6	4.o	4.5
1941-5o	11.9	4.1	4.8
1951-6o	31.2	6.2	9.4

3.5 During 1911-2o, there was a decrease in population as well as cultivation owing to the influenza epidemic and the decrease in cultivation was proportionately less than that of population. During 1921-3o, there was an increase in population but the cultivation more or less remained stationery. Since 1931, population has registered phenomenal increases leaving the cultivation far behind.

3.6 Land area per capita and area of cultivation per capita in 1951 by natural divisions is given by the following table.[6]

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5. Census of India, 1951, Uttar Pradesh Volume II pp. 252.
6. Ibid pp. 253.

Divisions	Total area per capita δ	Area cultivated and cultivable per capita δ	Area of cultivation per capita δ
Uttar Pradesh	1o1.5	82.7	61.3
1. Himalayan	346.7	117.5	41.4
2. East Plain	76.4	64.3	52.9
3. Central Plain	89.2	73.6	55.o
4. West Plain	97.4	82.o	65.2
5. Hills+Plateau	25o.1	2oo.1	1o5.8

3.7 The correlation of progress of cultivation with population growth can be seen more graphically if we examine the figures of total land area per capita, area cultivated and cultivable per capita and area of cultivation per capita.[7]

Year	Total area per capita	Area cultivated and cultivable per capita	Area of cultivation per capita
19o1	125.7	1o7.o	73.6
1911	132.o	1o4.9	77.3
1921	137.2	1o8.9	76.1
1931	128.3	1o1.7	73.9
1941	113.o	89.7	67.o
1951	1o1.5	82.7	63.o

UTILISATION OF LAND IN THE STATE

3.8 The following table which is derived from table 239, of the Census Report 1951, gives the classes of land with their corresponding acreage (actual and percentage)[8]

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7. Ibid, pp. 252.
8. Ibid, pp. 24o.
δ. area has been expressed in terms of cents of acres.

Class of land	Total area in acres
Total	72,298,798 (100)δ
I. Net cultivated area	40,108,036 (55.74)δ
II. Culturable	15,009,437 (20.76)δ
(A) Current Fallow	2,584,133 (3.68)δ
(B) Other uncultivated land	12,346,451 (17.08)δ
1. Old Fallow	717,904 (1.00)δ
2. Groves	1,371,039 (1.82)δ
3. Culturable waste	10,311,508 (14.26)δ
a. Other forests	4,256,900 (5.89)δ
b. Other culturable waste	6,054,608 (8.37)δ
III. Not available for cultivation	9,289,413 (12.85)δ
IV. Forest under Forest Department	7,891,910 (10.92)δ

3.9 The following table gives the cropping pattern of the State for the last five decades.[9]

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9. Ibid, pp. 240
δ. Figures in brackets indicate percentages of the total area.

	195o-51	194o-41	193o-31	192o-21	191o-11
Total food-crops	47,163 (1oo)	44,54o (1oo)	42,634 (1oo)	42,574 (1oo)	42,719δ (1oo)δ
Rice	8,2o1 (17.39)	7,257 (16.29)	7,o86 (16.62)	6,94o (16.3o)	6,58o (15.4o)δ
Wheat	7886δ (16.67)	7,947 (17.84)	7,281 (17.o8)	6,661 (15.65)	6,255 (14.64)
Barley	4,691 (9.95)	3,896 (8.75)	4,269 (1o.o1)	4,485 (1o.53)	4,864 (11.39)
Gram	6,182 (13.11)	5,647 (12.68)	5,335 (12.52)	4,899 (11.51)	4,548 (1o.65)
Juar	2,256 (4.78)	2,226 (5.oo)	2,398 (5.62)	2,176 (5.11)	2,619 (6.13)
Bajra	2,597 (5.51)	2,2o4 (4.95)	1,991 (4.67)	2,565 (6.o2)	2,493 (5.84)
Maize	2,118 (4.49)	2,o38 (4.58)	2,o52 (4.82)	2,232 (5.24)	2,3o8 (5.4o)
Total stable food crops	33,9o9 (71.9o)	31,215 (7o.o9)	3o,413 (71.34)	21,958 (7o.36)	29,667 (69.45)
Other food crops	7,731 (16.39)	7,462 (16.75)	7,389 (17.33)	7,619 (17.9o)	7,771 (18.19)
Total non foodcrops	5,523 (11.71)	5,863 (13.16)	4,831 (11.31)	4,997 (11.74)	5,28o (12.36)
Sugarcane	2,182 (4.63)	2,133 (4.79)	1,476 (3.46)	1,386 (3.26)	1,2o7 (2.83)
Other non-foodcrops	3,341 (7.o8)	3,73o (8.37)	3,355 (7.87)	3,611 (8.48)	4,o73 (9.53)

3.1o The estimates of acreage under various crops utilised in the the assessment of underemployment have been derived from 'Season and Crops Report, 1951' published by the Agricultural Department Government of Uttar pradesh. They are given division-wise in the following table (Figures for certaian hilly districts are separate).

δ. Figures in this table are in thousands.
δ. Figures in brackets are in percentages of total cropped area.

	Himalayan	East Plain	Central Plain	West Plain	Hills+ Plateau	U. P.
1. Rice	135,414	4,131,3o5	2,417,469	1,918,574	51o,565	9,113,327
2. Wheat	94,635	1,391,496	1,512,942	3,878,463	849,592	7,727,128
3. Barley	15,3o7	1,7o4,436	1,367,346	1,286,o61	217,885	4,591,o35
4. Juar	876	73,oo1	7o8,213	867,438	676,o53	2,325,581
5. Bajra	379	83,8o4	413,999	1,963,992	119,452	2,581,626
6. Maize	19,3o3	837,326	233,o55	894,299	51,o85	2,o35,o68
7. Gram	3o,2o6	762,9o5	1,554,o88	2,276,74o	1,4o3,6o8	6,o27,547
8. Sugar cane	16,662	55o,691	395,712	1,516,o84	25,392	2,5o4,541
9. Cotton	861	8o	1,154	1o1,918	1,663	1o5,676
1o.Fodder	15,838	137,47o	266,267	1,363,356	13,8o3	1,796,734
11.Mandua	6,523	21,884	3o,672	589	36o	6o,o28
12.Kondon	9	582,834	215,598	68,199	98,oo2	958,642
13.Sawan	2,132	25o,125	147,875	76,226	55,268	531,626
14.Potato	893	57,959	56,8o6	82,575	3,532	2o1,765
15.Other Vegetables	3,285	9o,116	129,513	182,5o4	13,558	418,976
16.Other Food-crops	43,o24	1,594,554	1,5o3,866	1,633,572	417,13o	5,192,146
17.Linseed	911	31,92o	14,367	4,o41	65,393	116,632
18.Sesamum	1,735	5,725	1o,172	1o,717	192,554	22o,9o3
19.Rape + Mustard	21,779	153,558	36,298	153,395	8,o14	273,o44
2o.Groundnut	64	1o,558	115,561	93,766	137	22o,o86
21.Other oil seeds	177	9o7	3,542	22,963	17,587	45,176
22.Hemp	1,363	66,o8o	61,448	54,854	27,757	211,5o2
23.Jute	718	2,o86	3,488	1o,372	5o2	17,166
24.Indigo	2	1	4	1,472	-	1,479
25.Opium	-	7,o68	5,263	8,355	-	2o,686
26.Tobacco	3o1	2,252	6,395	26,878	1,278	37,1o4
27.OtherNon foodcrops	8,268	114,681	34,637	78,793	18,1o9	254,488

3.11 /Acreage under different crops in 1951 in the districts of Almora, Garhwal and Tehri Grahwal and Hill-region of Nainital/ are given in the following.

Crops	Area in acres
1. Rice	4o5,7oo
2. Wheat	466,o58
3. Barley	221,136
4. Mandua	4o7,o71
5. Maize	25,663
6. Other foodcrops	126,611
7. Rape+ Mustard	19,376
8. Spices	2,321
9. Fibres	1,524
1o.Tea	968
11.Tobacco	5,438
12.Produce of Gardens	1o,455
13.Miscellaneous	4o,249

Chapter four

LABOUR UTILISATION IN AGRICULTURE

NATURE OF AGRICULTURAL WORK

4.0 In a manufacturing industry all the workers are employed on fixed weekly wages or monthly salaries. They have fixed hours of work on each working day with provisions for fixed leaves each year. As a record of attendance of workers is maintained by each firm, the number of workers engaged by firms on each day of the year can be easily found-out. By adding together the number of man-days worked in each firm, the total number of man-days worked in the whole industry can be ascertained.

4.1 In agriculture, however, things are altogether different. The agricultural industry is carried on as a household enterprise. The bulk of the labour power utilised is supplied by the household members. There are no fixed hours of work for them, nor is there any question of leaves. In peak seasons when labour requirements in agriculture are very high, household members of working age put in over-time work and females and children and others who are not usually engaged in agriculture also participate. In off-seasons, the agricultural workers have very little to do; most of their time is spent in idleness. The farmers are used to this fluctuating demand on their labour-power, and it has become a way of life.

METHOD OF ESTIMATING LABOUR-TIME UTILISED IN AGRICULTURE.

4.2 The farmers do not keep any record of the time utilised in agriculture either of household members or hired workers. Hence

it is not possible to determine the actual number of man-days or labour-days utilised in agriculture directly as in manufacturing industries.

4.3 There appears to be only one way of estimating the labour-time spent in agricultural industry. This is first to find out the average or normal man-days that are utilised per acre to grow a crop under the existing conditions of production; by multiplying then the total acreage under this crop by the average number of mandays required to produce it, we can estimate the total number of man-days utilised in producing this particular crop in a certain region. Finally by adding together the totals of mandays that are utilised in producing all individual crops in a region, the total number of mandays utilised in agricultural industry in that region can be estimated.

4.4 Symbolically if a_1, a_2, a_3, ... a_n are the acreages under the n crops that are grown in a region, and l_1, l_2, l_3,..... l_n are the numbers of labourdays per acre that are utilised in agriculture in that region for growing crops respectively. Then the total number of labourdays utilised is

$$a_1l_1+a_2l_2+a_3l_3+.....+a_nl_n = \Sigma a_nl_n$$

SOURCES OF DATA FOR LABOUR-UTILISATION IN AGRICULTURE

4.5 Except in the National Sample Survey,[1] 5th, 6th, and 7th round, no data have been collected about the labourdays utilised in growing various crops. On the request of the present writer, the

1. National Sample Survey of India, Ministry of Finance, Government of India.

the Deputy Director of Seeds and Farms, Uttar Pradesh, Mr. A. H. K. Sahebzada, issued a circular to all the Government Agricultural Farms under his jurisdiction for supplying abstracts from their records regarding human labour utilisation for the last five years. A number of Government Farms[2] have complied with the request and have sent the required data, but the estimates of labour-days utilised per acre for growing each crop on various farms are so divergent that no representative value can be obtained from them.

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2. The following Government Farms have supplied the required data to this date.

Agricultural Farms	District	Date of their sending the information
1. Gursahaiganu	Farukhabad	Oct. 18, 1956.
2. Hardoi	Hardoi	12, "
3. Amrokh	Jhansi	4, "
4. Gwaldam	Garhwal	1, "
5. Jalpur	Sitapur	Sept.25, "
6. Tinsuhi	Mirzapur	8, "
7. Meerut	Meerut	7, "
8. Nawabganj	Bareilly	3, "
9. Benaras	Banaras	21, "
10. P.O. Migohie	Seharanpur	August25, "
11. Kalai	(Aligarh	Data was collected by visiting these farms personally in March April, '55.
12. Jehangirabad	(	
Niblett	(Barabanki	

4.6 The writer has come across two other sources giving labour requirements for growing various crops per acre. The first source is a book ''Sachitra Krish Vigyan''[3] where the author gives normal labour requirements for various crops according to operations. The other source is a statement prepared by the Agricultural Department, Uttar Pradesh, for checking the labour-time utilised by various non-mechanised Government Agricultural Farms in performing agricultural operations in growing certain important crops. While the first source is the outcome of an individual's estimates of labour requirements and liable to error, the other source pertains to non-mechanised Government Agricultural Farms and covers only a limited number of crops.

4.7 The following tables give the labourdays required per acre for growing main agricultural crops in Uttar Pradesh according to the sources specified.

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3. Sachitra Krish Vigyan by Shyam Parsad Sharma, B.Sc. 1954.

LABOURDAYS REQUIREMENTS IN PRODUCING VARIOUS CROPS AS GIVEN IN SCHITRA KRISH VIGYAN

Crops >	Wheat	Paddy[α]	Maize	Juar	Arhar	Cotton	Sugarcane
Operations							
1. Soil Preparations	1o	8	5	5	4	5	28
2. Manuring	3	2	2	-	-	1	3
3. Sowing	2	3	3	2	2	2	11
4. Irrigation	6	6	2	-	-	6	5
5. Making trenches	1	-	-	-	-	-	-
6. Weeding or hoeing	5	1o	1o	1o	6	8	36
7. Earthing up	-	-	-	-	-	-	2o
8. Watching	-	-	3o[β]	3o[β]	-	-	1oo[β]
9. Harvesting	1o	1o	8	1o	5	35	3o
1o. Threshing	2	1o	15	4	4	-	-
11. Winnowing	8	-	-	2	-	-	-
	47	49	75	6o	21	57	233

α. broadcast paddy only.
β. boy labour

STATEMENT SHOWING LABOUR HOUR UNITS FIXED FOR DIFFERENT OPERATIONS IN IMPORTANT CROPS

Name of crops >	Wheat	Barley	Paddy	Juar or Maize	Sugarca
Operations ↓					
1. Ploughing	12o	8o	7o	3o	13o
2. Manuring	3o	2o	3o	1o	95
3. Sowing	4o	4o	4o	3o	11o
4. Planting	-	-	12o	-	-
5. Irrigation	5o	4o	4o	-	6o
6. Weeding +hoeing	2o	2o	8o	4o	19o
7. Harvesting and Threshing.	1oo 16o	1oo 6o	1oo 1oo	5o 4o	1oo -
	92o	36o	58o	2oo	685
Total labourdays at 8 hours a day	65.o	45.o	72.5	25.o	85.
Total labourday at 1o hours a day	52.o	36.o	58.o	2o.o	68.

Source: Office of the Dy. Director of Seeds and Farms, Governm

δ

ESTIMATE OF HUMAN LABOURDAYS EMPLOYED PER ACRE FOR GROWING VARIOUS CROPS

Crop >	rice	wheat	barley	jowar	bajra	maize	gram	sugarc
Season >	Kharif	rabi	rabi	kharif	kharif	kharif	rabi	kharif+r
Labour-days >	51.o3	48.24	43.7o	23.o6	2o.88	31.54	23.34	95.o3

Crop >	Mandua	Kondon	Sawan	Potato	other vegetables	oth
Season >	kharif	kharif	kharif	khrif+rabi	kharif+rabi+summer	Khri
Labour-days >	69.o91	132.55	14.58	122.33	111.51	

Crop >	linseed	sesamum	rape+mustard	groundnut	other oilseeds	her
Season >	rabi	kharif	rabi	kharif	rabi	kha
Labour-days >	7.87	29.83	9.31	16.25	25.16	1o.

Crop >	indigo	opium	tobacco	other non-food crops
Season >	-	-	kharif+rabi+summer	-
L.days >	5o	1oo	86.22	31.31

δ. Source: based on data collected in the 5th, 6th, and 7th round of NSS schedule

METHOD OF PROCESSING DATA FROM NSS

4.8 In the calculation of labourdays required per acre for various crops, the average labourdays per acre of 4o crops given in the NSS schedule 2.1 were first calculated, for the 5th,6th and 7th rounds. NSS provides entries for both acreage sown and acreage harvested for 12 major crops.[4] In case of these crops average labourdays per were taken in respect of both acreage sown and acreage harvested and then the mean of the two was derived. In case of other crops, area harvested alone was recorded, hence the average labour requirements were calculated according to area harvested. In a number of cases entries regarding the same crop were made in more than one season. For example entries regarding rice were made besides Kharif, in Rabi and Summer also. The present estimates have been made on the basis of data corresponding to the main season. For collective items like other foodcrops or other vegetables the data cover all the seasons. Entries were divided more or less evenly between Kharif and Rabi in case of sugarcane and potato, and among Kharif, Rabi and Summer in case tobacco, hence in case of these crops data corresponding to two or three seasons have been utilised.

4.9

4.9 The break-down of crops as given in the Season and Crop Report published by the Government of U.P. does not coincide with that of the NSS. The former contains 28 items only, whereas the latter has 4o items. The NSS data has been reclassified so as to correspond with the break-downs in the Crop and Season Report.

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4. These crops are:1.rice, 2. wheat, 3. barley, 4. maize, 5. jowar 6. bajra, 7. small mittlets, 8. ragi, 9. gram, 1o. jute, 11. cotton, 12. groundnut.

The average number of labour-days required for growing the 28 crops or groups of crops in the three successive rounds did not tend to be uniform. The figures pertaining to major crops, however, showed greater degree of consistency. As the data regarding the labour-days requirements per acre were collected in three rounds of NSS only [5], only 3 sets of estimates could be available. Hence we had to base our calculations on only three estimates of labour requirements of individual crops per acre. As the estimates were so few and inconsistent in respect of some minor crops, a mean, median or a mode could not be expected to give most representative figure. Geometric average was, therefore, taken of the three estimates for each crop, excluding those averages that appeared very inconsistent. The averages for each round and the geometric mean of the three rounds for each crop is given in the Appendix I.

4.1o For checking the accuracy of the NSS data, two sets of data in regard to major crops have been given above. It is noticeable that NSS estimates do not differ widely from them. In case of sugarcane, maize, or jowar crops estimates given in 'Sachitra Krish Vagyan' are very high. This excess is because of the fact that they include 1oo and 3o days of boy-labour respectively for watching. This may be true in some cases, but it is certainly not true in general. In the Krish Vagyan, figures for soil-praparation of sugarcane are also very high, and in case of berseem figures for harvesting. There is greater degree of accord between the estimates prepared by the Office of Dy. Director of Seeds and Farms and those of the NSS., for the limited number of crops given in the former source.

5. Books containing enquires regarding human labour have been reintroduced in the 11th round of the NSS, 56-57.

4.11 The NSS estimates cover all the human labourdays utilised for growing various crops from soil and seed-bed preparation to harvesting, threshing and storing. In the Crop and Season Report of U.P. acreage for fodder has been also given separately. But in the NSS schedules, labourdays required for producing fodder have been recorded in another block along with the production of 18 other plants.[6] It has therefore not been accounted for in the main crops but the labour-requirements for producing fodder has been included in the total of other crops. The estimates of labourdays utilised in the production of other crops are based on the data collected in the 5th and 6th round only. The data were tabulated by natural divisions. The estimates from the two rounds for the State as a whole were quite consistent, but for divisions, there were discrepancies. We took the mean of the two estimates for each natural division and the State.

4.12 Apart from growing main agricultural crops, there are other productive activities connected with the growing and looking after of fruit tree, bamboo ~~etc~~., timber and firewood, fodder and grass etc, as given in the footnote no. 6, below. Secondly, activities connected with the up-keep and maintenance of draught, milch and other cattle of the household. Thus the total number of labour-days worked by agricultural workers can be broadly classified in 3 categories.

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6. The items included in other crops are 1. mango, 2. citrus 3. banana 4. other fruits 5. cocoanut 6. arecanut 7. other nuts 8. betel leaves 9. bamboo 1o. cane hogla 11. other reeds 12. fuel wood 13. timber, 14. soft wood, 15. fodder, 16. grass, 17. flowers, 18. others.

1. Labourdays worked for growing main agricultural crops;
2. Labourdays worked for growing other plants, fruits , fodder etc.;
3. Labourdays worked for up-keep and maintenance of cattle.[7]

4.13 Labour-days worked for growing other plants, fruits, fodder and fuel etc. have not been estimated by any other source except the NSS, hence the estimates given by the latter cannot be compared or checked by any other estimates.

4.14 The NSS schedules have recorded too high figures for the number of labourdays for the maintenance of draught and other cattle. Generally, if a household possesses one bullock, then 365 days have been recorded for this purpose, and if the household possesses two bullocks, then either 365 days or just the double, 730 days were entered. There seems to be some definitional discrepancy involved. Perhaps the investigators entered what they were informed on their questioning, without cross-questioning or going behind the replies that they received from the informants. The labourtime required for the maintenance of cattle does not rise in the same proportion as the number of cattleand the labourdays do not increase as a multiple of 365. We have therefore taken 2 1/2 hours per bullock as the normal time required for the up-keep and maintenance of cattle. This includes, besides collecting fodder, cutting it, serving two or three times a day and storing cowdung and urine, other services such as watching, scavangering etc. Two and a half hours may appear too high. But it must be remembered that a majority of the households have other cattle also

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7. This includes besides regular services on cattle, other services such as watching crops as well cattle, worktime spent on repairs and maintenance of toos etc. also. The latter, however, accounts for very little time per year.

besides the draught ones. In the present estimates no labourtime has been allowed for the additional cattle. This has been done because of the fact that young cattle below 3 years are not cared and very little time is devoted for their maintenance. In case of cows or buffaloes, they are attended to as long as they are in milk. but as they grow dry, less attention is given to them. Taking all these considerations into account, two and a half hours per day per working cattle is not high. As has been mentioned, on the initiative of the present writer, the Dy. Director of Farms and Seeds, Government of Uttar Pradesh issued a circular to all the agricultural farms under his jurisdiction. One of the enquiries of this circular pertained to human-labour-hours spent on the the maintenance of cattle and general services such as those of peons, scavangers, watermen, and watchmen. The replies received from various farms are widely divergent. On most of the farms who have responded to the enquiry, labour-hours spent on maintenance of cattle is less than two and a half hours per day per cattle. On the Kalai Government Agricultural Farm, which I surveyed personally, it is two and a half hours. The portions relevant to this item from the replies received from the Farms are reproduced below,[8] It shall be noticed that though the labour-time spent on cattle services alone is less than our own estimate, but if we include labbartime spent on other services, it appears that the assumption of 2 1/2 hours per cattle per day does not err on the side.

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8. Refer to Appendix II

Chapter five

VISIBLE AGRICULTURAL UNDEREMPLOYMENT

BASES OF THE ESTIMATE

5.o The formulae for measuring visible underemployment in any industry is

$$U = +\frac{W - E}{W},$$

where W is the total labour time available in the industry and E is the total labour-time worked during a year. The total labour time available W has been calculated on the following bases.

(1) Agricultural working class covers the first 3 agricultural classes of the census, i.e., it includes

(a) Cultivators of land wholly or mainly owned and their dependants,

(b) Cultivators of land wholly or mainly unowned and their dependants,

(c) Cultivating labourers and their dependants,

and it excludes

(d) Non-cultivating owners of land, agricultural rent-receivers and their dependants.

(2) All males between 15-55 have been taken as workers.

(3) The number of labourdays that a male worker can put in agriculture in a year is 35o, making an allowance for off days on account of festivals, festivities, illness, and bad weather etc.etc.

(4) Only that percentage of females has been taken as workers that has been recorded in Rural Man-power and Occupational Structure,[1] as workers, that is, earners and helpers.

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1. Rural Manpower and Occupational Structure. Ministry of Labour, Government of India, 1954, pp. 155.

(5) Labourdays put in by boys and girls has also been taken into account. The proportion of such boys and girls has been based on that given in the 'Rural Man-power and Occupational Structure'.

(6) It has been assumed that each female worker can work for 3oo days in a year.

(7) It has been assumed that each boy and girl participating in agriculture works for 239 days per year. This is based on the estimate of the ALE.[2]

LABOUR DAYS AVAILABLE IN UP IN 1951.

5.1 The following table shows the number of males, females and boys and girls working in agriculture in 195o-51.[3]

Natural Division	Male workers	Female workers	Boy workers	Girl workers
1.Himalayan	5o7148	465777	17838	17838
2.East Plain	3738133	147o832	3o8875	1o2958
3.Central Plain	3285689	1584286	214415	5oo3o
4.West Plain	43o1393	81o565	2358o1	44213
5.Hills+Plateau	787996	4o4423	2o221	17332
U.P.	1262o359	4735883	4735883	232371

5.2 Multiplying the number of male workers by 35o, of female workers by 3oo and of boys and girl workers by 239 and adding all together we get W, by natural divisions and for the whole of U.P.

Natural Divisions	W= Total labour-days available
1. Himalayan	325761
2. East Plain	1848o25
3. Central Plain	1688479
4. West Plain	1815581
5. Hills and Plateau	4o61o1
U.P.	6o83947

2. Agriculrural Labour Enquiry, Vol II, North India, Ministry of Labour, Government of India, 1954, pp.24, 3. Ref. Chapter four.

TOTAL LABOURDAYS WORKED IN U.P. IN 1950-51.

5.3 Total labourdays worked in agriculture in 1950-51 has been calculated on the following bases;

(1) Labourdays required per acre for producing various agricultural crops were calculated on the basis of data supplied by NSS., 5th, 6th, and 7th round after checking from other sources.

(2) Labourdays required per acre for producing various crops were multiplied by the number of acres under the respective crops in 1950-51 and their aggregate gives the total number of labour days worked in the production of main crops.

(3) Labourdays worked in the production of other crops were derived from 5th and 6th round NSS schedules 2.1 rural by taking an average of the two estimates.

(4) Labourdays utilised for the upkeep and maintenance of draught cattle were calculated on the basis of 2 1/2 hours per day per draught cattle. The reasons for this have already been discussed in the preceding chapter. In case of Himalayan Division, only 1 1/2 hours per draught cattle per day have been allowed as it has 2 1/2 acres of pasture per bullock against 1/3 acre in Gangetic plain and 1 acre in Hills and Plateau.[4] So it is quite natural that the labourtime spent on cattle-keeping shall be lower in the Himalayan, Division.

5.4 The table below gives the total labourdays worked in agriculture of Uttar Pradesh in 1950-51.

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4. Land Management in U.P. cited in Census Report of India 1951, Vol. II, North India, pp. 258.

Natural Division	Labourdays worked in			E= total labour days worked(ooo)
	main crops (ooo)	other crops (ooo)	cattle-service (ooo)	
1. Himalayan	1o7497	14o947	36459	2849o2
2. Eeast Plain	565413	438777	418393	1422588
3. Central Plain	46o237	241o36	4o2o9o	11o3363
4. West Plain	739168	1445o3	467954	1351625
5. Hills+Plateau	162273	21178	116o95	299546
ø. U.P.	2o34593	986441	144o99o	4462o24

VISIBLE UNDEREMPLOYMENT

5.5 After W, E have been estimated for each division and for the State as a whole, the U, i.e., visible underemployment can be measured. It is as follows:

Himalayan	East	Central	West	Hills+Plateau	U.P.
.125	.23o	.347	.256	.262	.267

5.6 As the figures for Himalayan Division are partly imputed,[5] the U excluding Himalayan is .275, that is, 27.5 per cent of the total labour-time available remains unutilised. It means that an agricultural worker works for about 5.8 hours per day on an average. During peak seasons, the extent of employment may be more than 8 or 1o hours per day but during the off-seasons the employment may be far lower. Appendix III gives the detailed table regarding visible underemployment.

COMPARISON WITH OTHER ESTIMATES

5.7 The Census Report [6] has given certain rough estimates of agricultural underemployment in terms of what has been defined as active workers. Self-supporting persons having cultivation as the

5. Acreage under different crops given in the Crop and Season Report as well as the proportion of males females, boys and girls working in agriculture are not as accurate in case of the Himalayan Division as in others.
6. Census of India, 1951 Vol. II, North India, pp.258.

principal means of livelihood are classed as 'active' workers. The 'semi-active' workers consist of (a) self-supporting persons of all classes other than cultivation having cultivation as their secondary means of livelihood. (b) earning dependants of agricultural classes. Cultivation includes all agricultural livelihood classes except class IV, relating to non-cultivating owners of land and agricultural rent-receivers. For purposes of the calculation of underemployment an active worker is treated as one unit, an earning dependant equivalent to one-third of an active worker and a self-supporting person with cultivation as his secondary to one-sixth of an active worker. The degree of underemployment is measured on the basis of a normal economic holding. The CR[7] estimates the following acreage under cultivation per effective worker by natural divisions.

Natural Divisions	Effectively active workers in cultivation	Area sown+current fallow in 5o-1	Area per effective worker
1. Himalayan	735817	19,61,o64	2.67
2. East Plain	5112438	1,oo,47,652	1.97
3. Central Plain	411619o	96,o62855	2.33
4. West Plain	4811273	1,6o,26,427	3.33
5. Hills +Plateau	1o49o29	51,29,676	4.89
U.P.			

5.9 Assuming that 1o acres is an economic holding for an agricultural family, CR infers that the economically cultivated area per effectively active worker would be 6.17 acres. "There is thus a surplus of man-power in agriculture throughout the State, the surplus being the highest in East Plain follwed by Central Plain. For the whole State the surplus works out as about 89 lakhs effectively active

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7. Ibid., pp.248 table 238.

workers. This is also a measure of the underemployment The extent to which we can divert this surplus to non-agi operations will be an index of the economic progress of the State.[8]

5.1o According to the estimates made by the C.R. there is visible underemployment ~~as 2o~~ 56.24 per cent of what has been defined as active workers.

5.11 Apparently this estimate is alarming and is in keeping with the general note of the All India Census Report presented by Sri R.A. Gopalaswami Registrar General, India, A close scrutiny will however, reveal that this estimate is quite erroneous.

5.12 C.R.'s estimates are of crude and arbitrary nature. One does not know why an able-bodied earning dependant between 15-55 be taken as 1/3 of an active worker. It is true that any ratio will not affect the final estimate, if the same ratio is assumed in the work performed by a self-supporting person and an earning dependant. But in this case, an arbitrary size of economic holding has been taken for all Natural divisions without any calculation of labourdays required for cultivating an area of 1o acrea. On the basis of these assumptions, '' the economic cultivated area per effectively active worker would be 6.17 acres''. While this size may be too low for Himalayan Divisions and Hills and Plateau, it is likely to be high for the remaining divisions. In growing crops like sugarcane, potato, vegetables, more than 1oo labourdays are required, and if wheat, barley etc., are grown in Rabi and Rice, Maize etc., in Kharif, the labour requirements will amount to roughly 75 to 8o per acre per annum. If we take an average of 75 mandays per acre, 6 acres will require about 45o labourdays. A pair of bullocks would require 228 days in addition. Besides this, other plants and

fruit production will demand about 2oo labour-days. Thus the total labour days amount to 878. Obviously an effective worker cannot perform so many days' labour.

5.13 Some non-official estimates have also beem made of the degree of underemployment in Indian Agriculture. Dr. Nabagopal Das[8] has estimated surplus agricultural labour force on the basis of an average ''work-unit'' of 1o acres per cultivator. According to him this work unit is the area which a peasant can cultivate with the aid of his family and a pair of plough cattle. He puts prewar surplus of agricultural labour-force in the larger part of India at 15.5 million. Tirlok Singh[9] has also estimated agricultural underemployment on the basis of 1o acres' work unit. These estimates are as crude as the one given by the CR and does not need any further comment.

5.14 Dr. Moti Lal Gupta[1o] in his ''Problems of Unemployment in India'' has given what he calls 'a scientific estimate'. But his approach rests basically on the same assumptions as the above two, of which he is so critical. Instead of having one 'work unit he assumes three work units, of 5, 7.5 and 1o acres corresponding to lands of the best fertility, medium fertility and low fertility. This is perhaps, some improvement on the earlier estimates in the sense that Dr. Gupta goes into greater details, and he distinguishes lands of varying degrees of fertility and determines his holding sizes that ''would provide opportunities for the full time use of the available labour of families cultivating lands of the different qualities'' But when he comes to the demarcation of best, medium and low fertility areas, he, perhaps due to lack of statistics, falls into

8. D.Ghosh, Pressure of Population and Economic Efficiency in India (New Delhi; Indian Council of World Affairs, 1946)p.87 cit. Dr.Gupt
9. Tarlok Singh; 'Poverty and Social Change' 1945, pp.92-3.
1o. Problems of Underemployment in India; Dr. Moti Lal Gupta pp. 25.

a pitfall. He assumes that these areas correspond to high medium and low density subregions. This may be partly true; but it is not scientific to base the estimates of excess of surplus population on the pressure of population in various regions itself.

5,15 Moreover, when Dr. Gupta proceeds to estimate seasonal under-employment over what he has already calculated which he calls disguised underemployment he disguisedly commits the mistake of 'partial double counting'. When size of holdings has been vaguely defined as those which provide full-time work, it is to be expected thet the workers of the households having the required size of holdings have optimum employment during the year. But his later analysis shows that perhaps what he means by'full-time use' of the available labour of the families is that working members of such families whose holdings are equal or more than the minimum holdings prescribed by him have full-time work only during the peak seasons- During the off-seasons, however, all household workers are not totally unemployed. There are draught cattle to maintain and are some other jobs which are postponed for periods of relative relief during the off-seasons such as construction of dams, prevention of erosion, watching of standing crops etc. It may be pointed out that on an average a worker may have such and such number of days without work. But the number of such days shall be far smaller on holdings that have been designed by Dr. Gupta than on holdings in general. In short, the period of seasonal unemployment shall be greatly reduced, on optimum hodings. It shall not be in case of owners and tenants. In case of landless agricultural labourers, however, it may extend upto 12 months. That is to say seasonal underemployment should be calculated on the basis of unmber of households that would be arrived at by dividing the

total cultivated area of various degrees of fertility by the corresponding optimal size of holdings alone and all agricultural labourers without land should be regarded as unemployed. Hence the calculations made by Dr. Gupta seem to be rather confusing and unscientific.

5.16 B. Datta [11] has estimated surplus agricultural labour on a different basis. He assumes the work-done in double crop area as the standard full-time work for cultivator, He notes that about 16 per cent of the cultivators are fully employed. The rest of them, i.e., 84 per cent. are idle for about four months in a year. Thus 28 per cent of the working labour-time is wasted in agriculture. This estimate is also very crude and it is not clear whether agricultural labourers (landless) should be included in working force or not. But it emphasises an important fact that if area under double cropping is increased, the degree of underemployment will be reduced.

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11. B. Datta; The Economics of Industrialisation (Calcutta; The World Press Ltd. 1952, pp. 65-66. Op. Cit ''Problems of Unemployment in India'' by Moti Lal Gupta.

Chapter six

INVISIBLE AGRICULTURAL UNDEREMPLOYMENT

INVISIBLE UNDEREMPLOYMENT

6.0 Visible underemployment measures the extent of surplus labour-time actually available in an industry under the existing conditions of production. Invisible underemployment measures the proportion of labour-time that is currently being utilised in the process of production but it may be released if improved techniques or organisation of production are introduced. These improvements should be of a nature that do not require any net addition of capital outlay. Even under the present methods of production, agriculture does not provide enough work for all the agricultural workers, but if some improved tools and implements are introduced, involving more or less the same amount of capital outlay, the proportion of surplus labourtime may be greatly increased. Invisible underemployment measures the extent of this additional surplus of labourtime. The present chapter aims at estimating the degree of such underemployment in agriculture of Uttar Pradesh.

6.1 Farming consists of a number of operations that are performed at suitable intervals. All operations are not equally important for all crops; the extent of each operation that is required differs with the kind of crop. Most of these operations can be performed with improved implements in less amount of labourtime than with the existing tools and implements. By multiplying the aggregate amount of labourtime saved, due to improved techniwues, in all the operations for growing a crop with the total number of

acres under it, the total saving of labourtime for growing that crop in the whole of a region in a particular year may be ascertained, Adding up, them, such totals for all crops grown the total amount of labour released from agriculture can be calculated.

6.2 Let a_1, a_2, a_3,.....be the number of acres under crops c_1, c_2, c_3, ... respectively and let Cr(Os) denote the number of labourdays released per acre in the operation 's' of crop 'r' due to the use of improved implements and techniques,

then, the total number of labourdays released in a certain

year $= \sum_r \sum_s a_r . Cr(Os)$

6.3 Farming operations can be conveniently grouped in 4 categories as follows:[1]

1. Soil and seed-bed preparation
2. Sowing and transplanting
3. Weeding and interculture
4. Harvesting and threshing

SOIL PREPARATION

6.4 Soil preparation involves all those preparatory operation that make the soil fit for sowing. The implement which is most common in India for soil preparation is indigenous plough. More than 9o per cent of the cultivation ploughs are of this type. It consists of a wooden bottom with a pointed steel share which is connected through a wooden beam to the yoke of the bullocks. It costs about Rs. 1o to Rs. 12.

1. Irrigation which is an important farming operation is not included here. There are innumerable ways of irrigating fields in India. But as data regarding acreage irrigated by various methods is not available, no quantitative estimate can be made about labour release with improved methods. Locally most suitable method is used in general.

6.5 Although in recent years there has been noticed little improvement in the indigenous ploughs, yet modern ploughs of the western type or their imitations have been introduced in Indian cultivation. These are all mould-board ploughs. The six inches width plough is most commonly used in Uttar Pradesh and Delhi. The depth of ploughing obtained is between 4 to 6 inches and the draft in sandy loam soil varies between 16o-2oo pounds. The plough is of light draft having a total of 4o lbs. and can be worked by an average pair of bullocks. It is available in Indian markets for about Rs. 22 at present. Experience shows that modern ploughs are not heavier in operation than the indigenous ones. The modern ploughs plough twice as much land per hour as the indigenous ones. In the beginning of rains, and for the first two or three rounds in the soil preparation for Rabi crops, the modern ploughs are very suitable. If we extract mould board, then they can be used for the preparation Rabi seed bed. The modern ploughs, however, cannot be used for sowing purposes, and the farmers have to keep either seed-drills or the indigenous ploughs for the purpose.

6.6 There are other implements, not very constly which can be used with advantage for further soil preparation. Among them we can consider harrows and cultivators.

6.7 Ploughing is completed by various operations such as clod breaking, levelling the ground and compacting. When the ploughed ground is in a workable condition, these operations can be performed with a harrow, If, however, the soil is heavy and has dried out before the harrowing is possinle, a heavy digging hoes is, perhaps the best tool with which the small farmer may break hard

and compact clods. There are various types of harrows, such as tooth harrow, blade harrow and rotary hand harrow. Their costs vary from Rs. 1o to Rs. 15.

6.8 The cultivator is an implement for soil stirring, intermediate between the plough and the harrow in that it penetrates deeper than a harrow but not, as a rule, quite so deep as a plough. It is more or less a development of the primitive plough, but a great number of points or tines (generally from 3 to 7) are used and thus a much wider strip of land is tilled. Cultivators may be animal drawn or hand-drawn.

6.9 In Uttar Pradesh, it is the indigenous plough, that is used continuously for soil preparation. If the soil is hard and is not inverted, hand-hoes which are known by different local names are used. The indigenous method of soil preparation takes too much labourtime. The following table gives the labourdays required under existing techniques and the labourdays saved due to the introduction of improved implements.

Crops	Labourdays required per acre under existing conditions for soil preparations	Labourdays releaser per acre under improved techniques of production
Wheat	12-15	8
Barley	1o-12	6
Gram and Pea	4-6	2
Maize and Jowar	4-5	2
Paddy(Bhadai or scattered seed)	1-3	1-2
Paddy(Agahni or transplanted see)	3-7	
Sugarcane	13-2o	4
Cotton	6-8	2
Other crops	-	1

SOWING AND TRANSPLANTING

6.1o Soil and seed-bed preparation is followed by sowing. At the present, in India sowing is done mostly by hand, Seeds of Rabi Crops like wheat, barley, grams etc. are sown in furrows. Generally a female with seeds walks behind the ploughman, who make the furrows of required depth by driving the bullocks yoked to an indigenous plough, and keeps droppeing the seeds in the furrows at certain distances suited to the crops. This involves a higher and uneven seed rate per acre and also needs subsequent thinning down requiring extra labour cost per acre, for weeding. It will be thus in every respect an advantage if this method of hand-sowing is undertaken by some seeding machine.

6.11 The Indian seed drills are known by several names in different parts of India. They are known as Kurige in Karnataka, as Gorru in ceded districts of Andhra and as Tiffan in Madhya Pradesh, and as Terafei in Gujerat.[2] The country drills have two, three or more tines. But most of the country drills require a second man to dribble the seeds.

6.12 The most upto date drills of the modern type have an axle bearing through a chain and a dog clutch. The machine is light and can be very easily handled by an acerage pair of bullocks. The seed-hopper holds more than a maund of wheat seed and in one day of 1o hours, it can sow up to 4 acres with 5 spouts in use. The machine is capable of sowing any crop seeds from as large a seed as gram to as small as Bajra and the seed rate is adjustable

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2. Agricultural Implements for Indian Farmers: Ramia, R.V., and Srivastava C.P. ICAR, 1954, pp. 28.

It can efficiently do five times as much work as desi plough with seeding spouts and places the seeds at a uniform depth and rate, which results in better germination and uniform ripening of crops. A seed drill thus can easily replace sowing by four pairs of bullocks. It takes 2 persons (i.e., two labourdays) to sow an acre in one day. A seed drill can sow 4 acres in a day requiring one person. Thus abour 1.5 labourdays will be saved in sowing of crops like wheat, barley. In most of the other crops scatter system of sowing is followed, hence no economy of labour can be realised in those crops.

6.13 So far there has not been discovered any improved method of transplanting which may reduce the amount of labour-time involved in transplanting paddy. So there is no possibility of any saving of labourtime in transplanting.

INTERCULTURE AND WEEDING

6.14 After sowing, when seeds have grown up, a number of important crops need interculture and weeding. Interculture loosens and stirs the soil around the plants, so that the roots of the plants may suck up the atmospheric vitamins. The usual method which is in general practice, in Uttar Pradesh, is the earthing up of soil with the help of digging hoes, commonly known as kudal. This method is highly wasteful of labourtime. Sugarcane requires interculture generally 4 to 5 times. Sugarcane interculture takes 10 labourdays per acre each time. Cotton requires interculture twice or thrice and it also takes 10 labourdays for one round. Maize requires interculture twice or thrice and if Jowar is sown in furrows it needs the same treatment as maize.

6.15 But if interculture is done with the help of cultivator 2 acres will be covered in a day of 8 hours. The cultivator is operated by two workers. It means that one worker will be needed for one acre of interculture per time. Once or twice in the beginning interculture has to be done by hand in any case; for the rest if interculture is done by means of cultivators twice or thrice in case of sugarcane and once or twice in case of cotton, maize and jowar, the average number of mandays saved will be as follows:-

Sugarcane	Cotton	Maize	Jowar
2o	12	12	6

6.16 Weeding is the process of eradicating grasses and other self-grown saplings from among the sown crops like wheat barley and paddy,(untransplanted). Usually this is undertaken with the help of Khurpi in Uttar Pradesh. This method is again very wasteful and consumes a good deal of labourtime. At least 6 labourdays are required for weeding one acre of wheat crop once. But if weeding is done by means of triangular harrow, two workers and a pair of bullocks will cover about 3 acres in 8 hours. It means that there is a saving of about 5 mandays per acre for weeding wheat crop once. For weeding twice there will be a saving of 1o labour-days. But as wheat crop may or may not need weeding or it may be weeded only once, it is supposed that on the whole, there will be a saving of about 5 labourdays, per acre of wheat crop grown and nil in case of barley as generally weeding is not done in barley fields.

HARVESTING AND THRESHING

6.17 In India, the scythe or the sickle is the main tool which is used for reaping. The work done per day by this method is

very little, It takes on the average 1o labourdays per acre for reaping wheat, barley and paddy.

6.18 Reaping machines can be successfully used in India for reaping grain crops by using bullock power and thus overcoming the shortage of manual labour at the harvesting time, when there is the heaviest peak load of work. The Mc. Cormic Deering Mowing Machine which is drawn by a pair of bullocks is a useful machine for harvesting wheat, oats, barley and other smallgrain crops. The mechanism is simple and it is easy to operate.

6.19 With a reaper, 4 labourdays will be needed for 4 acres in all. Hence there will be a saving of about 9 labourdays per acre. But as the collection of bundles and then taking the bundles to the barn will be done by the usual method, we suppose that there will be a saving of 4.5 labourdays in case of wheat and barley and some other crops. Reaper costs about Rs. 2oo to Rs. 35o.

6.2o The usual method of threshing is trampling the harvested crop with bullocks and separating the grain by manual labour. The task of threshing can be undertaken by threshers but it saves bullock labour only, not human labour. Cost of thresher is about Rs. 45/-.

6.21 There are, however, Japanese[3] pedal operated threshing machines which are simple and time-saving appliances for threshing paddy. They are light in weight, simple in construction, easy to manufacture and convenient to operate. There are no delicate parts to get damaged or fine adjustments to make. These machines are manufactured in two different sizes suitable for being worked by

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3. Ibid, pp. 28.

one or two men. With the use of these machines, the bullock power is completely spared for doing other important field work. The pedal threshers are recommended for paddy threshing operations.

6.22 The correct speed for operation of the Japanese threshers is about 35o-37o R.P.M. of drum, which is obtained by treading the pedal about 1oo times in a minute. One man tread thresher threshes about 8 1/2 maunds in 8 hours and the two man tread thresher does just the double.

6.23 It takes 6 labourdays for threshing one acre crop yielding 12 to 16 maunds of paddy. But the Japanese one man-tread or two man-tread peddlar threshes 15 maunds in two mandays. Hence there will be a saving of 4 labourdays, if the Japanese peddlars are used, for paddy threshing.

6.24 Use of winnower may be made when there is no sufficient wind for winnowing purposes. But there is little saving of human labour-time in this. A winnower costs about Rs. 6o to Rs. 8o.

COST OF IMPROVED TECHNIQUES.

6.25 The use of improved tools and implements may appear to involve net addition of capital outlay. a careful analysis reveals that it is not so. The introduction of improved techniques does not only release human labour but also cattle labour. The following table indicates the order of saving of pair of bullockdays in some of the major farming operations.

Operation	Existing implements	Improved implements	Work done by: Improved Imp. / Existing Imp.	Release of Bullock pair-days per acre
Ploughing	Indigenous plough	Mould-board plough	twice	1
Seed-bed preparation	do	Cultivator harrow	3-5 times	2-4
Weeding and Interculture	Khurpi and Kudal	do	6-1o "	-1
Irrigation	Charsa	Persian wheel	3 "	2
Reaping	Sickle and Scythe	Reaper	1o "	-1
Threshing	nil	Thresher	6 "	5

6.26 The above table shows wherever bullock-power is used both in old as well as new methods of production, there occurs a saving of one to four or five pairs of bullocks. Even knowing that some of the operations will have to be performed as they are done to-day such as carting, pulling water, crushing sugar-cane etc. and also that indigenous ploughs may be retained for some purposes, we can conveniently assume that if improved implements are introduced the number of bullocks needed will be at least halved. As bullock-power will be used in weeding and interculture and reaping also under the improved techniques, the employment of bullock-power will be more well-distributed and regular. These operations are at present performed with human labour when the bullocks have nothing to do and lie idle.

6.27 A pair of average bullocks costs about Rs. 4oo/ to Rs. 7oo/-. The cost of all the improved tools and implements referred to above is lower than the cost of a pair of bullocks. The approximate cost of improved implements along with their depreciation cost is given below.

Implements	Cost (in Rs.)	Life (in years)	Approximate depreciation (in Rs.)
1. Mould-board plough	22	1o	2.2
2. Cultivator	5o-72	1o-12	4.2-6.o
3. Harrow	1o-15	1o	1.o-1.5
4. Seed Drill	8o-12o	2o	4.o-6.o
5. Reaper	2oo-25o	15-2o	1o.o-16.o
6. Thresher	45	15-2o	2.3- 3.o
7. Winnower	6o-8o	15-2o	3.o- 3.3
8. Persian wheel	3oo-35o	15-2o	15.o-23.3
	767-954		41.7-61.9
A pair of bullocks	4oo-7oo	1o	4o.o-7o.o

6.28 The above rough calculations show that the introduction of improved tools and implements does not cause any rise in net capital outlay. Total cost of all implements amounts to about Rs. 41.7 to 61.9. The cost of a pair of average bullocks varies from Rs. 4oo to Rs. 7oo and the depreciation value works out to Rs. 4o to Rs. 7o.

6.29 The saving of cattle-power will not accrue to all farmers but only to those who have at least two pairs of bullocks. In some cases, it may occur to farmers with one pair of bullocks, provided that two of such farmers agree to combined ploughing and other agricultural operations. Households with one bullock only cannot avail of the economy in bullock power. They can, however, purchase less costly implements like harrow and save human labour in soil preparation and weeding. Households with small holdings can purchase other costlier implements in combination, as is common practice in case of sugarcane crushers which are mostly purchased and operated collectively.

DEGREE OF INVISIBLE UNDEREMPLOYMENT IN U.P.

6.3o Labourdays released due to use of improved implements and tools growing one acre of various crops have been summarised in table I, at the end of this chapter. Multiplying these labourdays by the corresponding number of acres under each crop in 195o-51[4], the total number of labour-days that could be released from farming operations in North India can be estimated. These have been shown in table II, col. (2) But the improved tools and implements can be brought into use without involving any net outlay of capital by only those households which have at least two pairs of draught cattle. From table III, col. (4) it can be seen that the average cultivated area per pair of draught cattle[5] varies from 5.14 to 8.6o acres for various divisions, the average for the whole of Uttar Pradesh being 6.24. It is stipulated, therefore, that a farmer holding 1o acres or more must possess more than one pair of bullocks.

Normally he will have 2 or more pairs, but in some cases he may have 3 or 5 bullocks when he shall have to coordinate the use of one of his bullocks with that of some other farmer having odd number of bullocks. Col. (3) of table II, represents the percentage of area cultivated by farmers holding 1o acres and more[6] and col (4) shows the number of labourdays released on such holdings.

6.31 Table III details the labourdays that could be released from being utilised on cattle services, Col. (2) represents the total area shwn in 195o-51, col. (3) the number of draught cattle and col. (6) the number of pairs of cattle released on holdings greater than 1o acres. This has been calculated on the stipulation that there could be a release of one pair[7] bullocks on the average sown per 2 pairs of working cattle on all holdings of 1o acres and above.

6.32 It has been observed in the preceding chapter that on an average 2 1/2 labour-hours are spent on the maintenance and upkeep of a draught cattle per day and other sundry tasks. The labour time spent on other cattle such as calves and milch and dry cattle is ignored. Calves and dry cattle are very meagrely attended to and the milch cattle are generally looked after by females as one of their pet household duties. As regards labour-time utilised by those

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4. Area sown under each crop was obtained from 'Season and Crop Report' for 195o-51 published by Government of U.P.
5. The number of draught cattle by natural division has been obtained from 'Indian Livestock Census 1951', Vol. II Directorate of Economics and Statistics; Ministry of Food and Agriculture; Government of India. In Himalayan Division, figures of draught cattle for districts of Almora, Garhwal, Tehri-Garhwal are imputed on the basis of Nanital and Dehradun for ILC gives details only about the latter two districts.
6. Census Report, Vol. II North India pp. 225, table 195.

households which keep milch cattle as subsidiary or secondary occupation, it has already been accounted for while estimating the number of agricultural workers. Col. (7) of table III shows the number of labourdays utilised in the maintenance and upkeep of cattle at the rate of 2 1/2 labour-hours per day per cattle, i.e., 114 labourdays per year.

6.33 Table IV shows the invisible agricultural underemployement in Uttar Pradesh in 1950-51. Col. (4) gives the total number of labourdays released from farming operation as well as from human labour spent on cattle services. Col. (7) represents the total number of labourdays worked in agriculture in 1950-51. It has been worked out by adding the labourdays utilised in agricultural operations for growing main crops, other crops and in the upkeep and maintenance of draught cattle. Col. (7) finally shows in percentage the degree of invisible underemployment by Natural Divisions and for the whole of North India, under the assumption that no organisational change is introduced.

6.34 The total human labour-days that could be released, thus, amounts to about 40 crores of 8.99 per cent of the total number of days worked which means wastage of about Rs. 25 crores worth of human labour.[7]

6.35 The release of pairs of cattle amounts to about 11.25 lakhs. assuming on an average one rupee[8] as the cost of cattle feed per pair, the saving of cattle feed amounts to about 41 crores in 1950-51. The total rural income of Uttar Pradesh in the same

7. Wage-rate for men agricultural labourers estimated by the 'Report on Intensive Survey of Agricultural Labour' Vol. II North India pp. 19, Rs. 1/2/10.

year may be taken about Rs. 1100 crores[9]. Thus the saving on cattle feed amounts to about 4 per cent of total rural income.

6.36 If we envisage a change in the organisational structure of farming, the advantages of improved methods might extend to holdings less than 10 acres also. If it is assumed that all holders of less than 10 acres enter into farming cooperatives holding above 10 acres, it is possible to see that all the improved techniques and improved tools and implements can be availed of without any net addition of capital outlay, as it will be possible then to release pairs of working cattle to compensate for the increased cost of improved implements.

6.37 If the small land-holders cultivate on cooperative basis so that total holding of the society exceeds 10 acres, the release of human labour from farming operation and cattle services will be greatly encreased. Table V shows the percentage degree of invisible underemployment, It amounts to 25.65 per cent of total labourdays put in in 1950-51 in Uttar Pradesh.

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8. Cost of cattle-feed has been taken equal to Re., per day per day per bullock and value cow-dung equal to as. 6/- in 'Cattle Development in the Uttar Pradesh' pp. 80-83 by RY L. Kaura, D.V.M., M.R.C.V.S., Director of Animal Husbandary U.P. Feb. 1950.
9. 'Uttar Pradesh, Through Figures, 1952-53' Economics and Statistics Department, Uttar Pradesh. pp. 3. This source gives figures for 1952-53. An approximate figure has been taken for 1951.

SUMMARY OF LABOURDAYS RELEASED PER ACRE DUE TO USE OF VARIOUS

Crops > Operations	Wheat	Barley	Gram+Pea	Rice	Maize	Jowar	Sugarcane
Soil preparation	8	6	2	1-2	3	1	4
Sowing transplanting	1.5	1.5	-	-	2	1	-
Weeding	5.0	-	-	-	12	6	20
Harvesting and threshing	4.5	4.5	-	4	-	-	-
	19	12	2	6	17	8	24

This table has been vetted by a number of persons who have spent their life-time
Among them, the following may be mentioned.

(1) Mr. Ratan Singh, Farm Superintendent, Kalai Govt. Aligarh. (2) Mr. Retired
U.P. and in-charge of Muslim University Aligarh Agricultural Farm. (3) Mr. Sh
Supdt. Jehangirabad Niblet State Mechanised Farm Barahanki. (4) Mr. Ali Khan,
Lucknow.

Table II

NUMBER OF LABOURDAY RELEASED FROM FARMING OPERATIONS

in

UTTAR PRADESH

Natural Divisions	Labourdays released from farming operations on all holdings.	Percentage of area cultivated under holdings greater than 1o acres.	Labourdays released from farming operations on holdings greater than 1o acr
(1)	(2)	(3)	(4)
1. Himalayan	1872o786	45.8	857412o
2. East Plain	1o4492842	28.8	3oo93938
3. Central Plain	85233423	3o.5	25996194
4. West Plain	172643637	31.6	54555389
5. Hills & Plateau	326o8261	64.8	2113o153
	413698949	35.o	144794632

Table III

LABOUR DAYS RELEASED FROM SERVICES ON CATTLE

in

UTTAR PRADESH

Natural Divisions	Total area sown in acres	no. of working cattle	average acres per 2 pairs	acres in %of holdings greater than 1o acres	Pairs of cattle released	Human-labour-days released
(1) (1)	(2)	(3)	(4)	(5)	(6)	(7)
1. Himalayan	1841763	52o822	14.16	45.8	59571	833994o
2. East Plain	9611582	367o11o	1o.48	28.8	264135	6o22278o
3. Central Plain	9o78489	35271o2	1o.28	3o.5	269352	61412256
4. West Plain	15193857	41o4861	14.84	31.6	323535	73765524
5. Hills+ Plateau	4382345	1o18376	17.2o	64.8	165102	37643256
U.P.	4o1o8o36	12841271	12.48	35.o	1124825	25646o1oo

Table IV

INVISIBLE AGRICULTURAL UNDEREMPLOYMENT

in

UTTAR PRADESH

Divisions	Labourdays released from farming operations (in unit)	Labourdays released from cattle service (in Unit)	Total labourdays released (in unit)	Total labourdays worked (in ooo)	Invisible Underemployment in percentage
(1)	(2)	(3)	(4)	(5)	(6)
1.Himalayan	8574120	8339940	16914060	28490 2	5.94
2.East Plain	30093938	60222780	90316718	1422588	6.35
3.Central Plain	25996194	61412256	87408450	110 3363	7.92
4.West Plain	54555389	73765524	128320913	1351625	9.91
5.Hills+ Plateau	21130135	37643256	58773409	299546	19.62
U.P.	144794632	256460100	401254732	4462024	8.99

Table V

INVISIBLE AGRICULTURAL UNDEREMPLOYMENT

under

COOPERATIVE SYSTEM OF FARMING

in

UTTAR PRADESH

Division	Labourdays released from farming operations (in unit)	Labourdays released from services on cattle (in unit)	Total labourdays released (in unit)	Total labourdays worked (in unit)	Invisible Underemployment in percentage
(1)	(2)	(3)	(4)	(5)	(6)
1.Himalayan	1872o786	1823877o	36949556	2849o2	12.97
2.East Plain	1o4492842	2o919627o	313689112	1422588	22.o5
3.Central Plain	85233423	2o1o44814	286278237	11o3363	25.95
4. West Plain	172643637	233977o77	4o662o714	1351625	3o.o8
5.Hills+ Plateau	326o8261	58o47432	9o655693	299546	3o.26
U. P.	413698949	751952447	1145651396	4462o24	25.68

Chapter seven

POTENTIAL UNDEREMPLOYMENT IN U.P.

POTENTIAL UNDEREMPLOYMENT

7.o The term potential underemployment is used to describe the amount of labour that might be released by introducing more fundamental changes than those described in connection with the measurement of invisible under-employment, by changing the method of production to a degree that involves net addition of capital outlay, or the scale of overall production. In India, average holdings are very small, and the tools and implements that are currently in use are highly labour-intensive. If the size of agricultural holdings are increased it is possible that a sizeable proportion of labour that is currently utilised in agriculture will be released. It has been seen that there will be released about 12 per cent of labour force engaged in Uttar Pradesh Agriculture, if improved cattle drawn implements are introduced. If, however, power-driven equipments are used instead of cattle drawn, the degree of labour displacement will be very high. Whether the adoption of power-farming involves net addition of capital or not, we shall see.

DISTRIBUTION OF HOLDINGS IN U.P.

7.1 In Uttar Pradesh the size of agricultural holdings is very small. The table below gives the percentage of holdings in different size groups.[1]

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1. Census of India, 1951; Volume II, Uttar Pradesh, pp.

Divisions	Under 2 acres	2-5 acres	5-1o acres	1o acres and over
Himalayan	42.4	26.9	19.6	11.1
East Plain	66.1	21.3	8.9	3.7
Central Plain	54.3	27.o	13.5	5.4
West Plain	51.o	28.o	14.6	6.4
Hills+Plateau	35.9	25.o	19.2	19.9
U.P.	55.8	25.4	12.8	6.o

From the above it is evident that only 6 per cent of holdings in Uttar Pradesh are greater than 1o acres and 12.8 per cent greater than 5 acres, i.e., about 81 percent of holdings are below 5 acres.

SIZE OF PLOTS IN U.P.

7.2 Not only are the sizes of holdings small but they are fragmented in small parts. The table below gives the size of plots under important crops in 195o-51, which has been constructed on the basis of the data supplied by the 5th round of NSS schedule no. 2.1. It shows the number of plots according to size groups relating to 7 important crops.

Crop	o- .1 acre	.1- .25 acres	.25- .5 acre	.5- 1 acre	1 acre and above	Total
rice	133 (19.3o)	233 (33.82)	174 (25.25)	11o (15.97)	39 (5.66)	689 (1oo.oo)
wheat	44 (1o.35)	98 (23.o6)	1o1 (23.76)	137 (32.24)	45 (1o.59)	425 (1oo.oo)
barley	63 (18.81)	114 (34.o3)	73 (21.79)	66 (19.7o)	19 (5.67)	335 (1oo.oo)
Jowar	1o (4.o5)	42 (17.oo)	78 (31.58)	9o (36.44)	27 (1o.93)	247 (1oo.oo)
Bajra						

crop	o- .1 acre	.1- 25 acre	.25- .5 acre	.5- 1 acre	> or =1 acre	Total no. of plots
maize	22 (16.67)	35 (26.52)	39 (29.54)	29 (21.97)	7 (5.3o)	132 (1oo.oo)
bajra	4 (2.11)	21 (11.o5)	67 (35.26)	66 (34.74)	32 (16.84)	19o (1oo.oo)
gram	26 (7.14)	85 (23.35)	121 (33.24)	96 (26.38)	36 (9.89)	364 (1oo.oo)

7.3 Table below shows the number and percentage to total of plots, of plots cultivated by farmers holding more than 7 acres according to size groups:-

Size groups in acres > / Crops	o - .1	.1- .25	.25- .5	.5- 1	=or>1	Total
rice	3o (13.16)	74 (32.46)	57 (25.oo)	49 (21.49)	18 (7.89)	228 (1oo.oo)
wheat	6 (3.68)	24 (14.72)	55 (33.74)	58 (35.59)	2o (12.27)	163 (1oo.oo)
barley	2o (15.27)	37 (28.24)	33 (25.19)	27 (2o.61)	14 (1o.69)	131 (1oo.oo)
jowar	8 (7.69)	14 (13.46)	26 (25.oo)	42 (4o.39)	14 (13.46)	1o4 (1oo.oo)
maize	2 (11.11)	3 (16.67)	8 (44.44)	4 (22.22)	1 (5.56)	18 (1oo.oo)
bajra	- (-)	1 (1.52)	2o (3o.3o)	25 (37.88)	2o (3o.3o)	66 (1oo.oo)
gram	15 (9.68)	24 (15.48)	46 (29.68)	48 (3o.97)	22 (14.19)	155 (1oo.oo)

7.4 The table below shows according to size-groups, the number and percentage of plots to the total number of plots under each crop among sample holdings of less than 7 acres.

Size groups in acres >	o- .1	.1- .25	.25- .5	.5- 1		
Crops						
Y rice	1o3 (22.38)	159 (34.49)	117 (25.38)	61 (13.23)	(illegible)	
wheat	38 (14.5o)	74 (28.24)	46 (17.56)	79 (3o.16)	25 (9.54)	262 (1oo.oo)
barley	43 (21.o8)	77 (37.74)	4o (19.61)	39 (19.12)	5 (2.45)	2o4 (1oo.oo)
jowar	2 (1.4o)	28 (19.58)	52 (36.36)	48 (33.57)	13 (9.o9)	143 (1oo.oo)
maize	2o (17.55)	32 (28.o7)	31 (27.19)	25 (21.93)	6 (5.26)	114 (1oo.oo)
bajra	4 (3.23)	2o (16.13)	47 (37.9o)	41 (33.o6)	12 (39.68)	124 (1oo.oo)
gram	11 (5.26)	61 (29.19)	75 (35.88)	48 (22.97)	14 (6.7o)	2o9 (1oo.oo)

7.5

7.5 The above three tables show that the size of plots under each crop varies with the size of holdings. On larger holdings the size of plots is also larger indicating lesser degree of fragmentation and on smaller holdings the size of plots is smaller. The difference would have been still more marked if 1o or 15 acres would have been taken as the lower limit of larger holdings. But the number of sample households with holdings of 1o or more acres was very small, so that no inferance could be based on them.

LABOUR-REQUIREMENTS ON HOLDINGS OF SMALLER VS. LARGER SIZES

7.6 The labour requirements on smaller holdings with relatively smaller plots are greater than on larger holdings. This problem was studied by estimating the average number labourdays utilised per acre in growing important crops on holdingsgreater than 7 acres based on data contained in the 5th and 6th round of NSS only.

Crop> Holding size	rice	wheat	barley	jowar	bajra	maize	gram	sugar cane	cottc
All	51.o3	48.24	43.7o	23.o6	2o.88	31.54	23.34	95.o3	51.83
>7acres	31.44	35.o	35.25	16,81	16.58	23.87	16.74	74.8o	28.69

The above gives the labourdays required per acre on all holdings as compared with those on holdings greater than 7 acres.

7.7 Weighting the two columns by the area under the crops in 195o-51 in Uttar Pradesh,[2] it is discovered that whereas the average number of labourdays per acre of crop grown is 43.o8 on all holdings, it is 3o.83 on holdings greater than 7 acres. It means that if the size of holding is raised to the minimum of 7 acres, there will take place a release of about 28 per cent of labour power.

POTENTIAL UNDEREMPLOYMENT PRESENT IN THE EXISTING DISTRIBUTION OF HOLDINGS

7.8 If the size of holdings is raised to 15 acres, there will be released an additional amount of labour power utilised in the maintenance and upkeep of cattle, provided improved tools and implements mentioned above are brought into use. The saving of human labour will amount to 15 labourdays per acre on all holdingsless than say 1o acres. As about 6o per cent of the area is held by farmers having holdings smaller than 1o acres, there will be an over all saving of 1o labourdays per acre, on the maintenance and upkeep of draught cattle. The creation of economic holdings of about 15 acres is likely to involve huge displacement of labour power. It will be in the neighbourhood of 35 to 4o per cent if along with the creation of economic holdings, improved implements are also brought into use, as it should be.

2, This is shown in Appendix No. IV

POWER-FARMING

7.9 Non-power agricultural equipments have been discussed in the course of calculations for invisible underemployment. It was shown that the introducion of these implements does not involve any net addition of capital outlay. But it is generally believed that the adoption of power farming requires a very high capital outlay, so that it changes the capital-output ratio. It will be seen presently whether capital coefficient is markedly changed or not after the introduction of power-machines.

7.1o The main power-machine used in agriculture is the tractor. There are two main types of tractors: WHEEL type and CRAWLER type. Tractors are equiped with either high-speed diesel oil operated or power kerosene operated power units. Wheel type tractors were manufactured in the early days of tractor production and were fitted with steel wheels. But to add to the usefulness to this motive power, the steel wheels were replaced by the pneumatic tyres which made tractors fit for swift transport of farm produce;. Wheel tractors can be conveniently classified as :

(1) Garden Tractors
(2) Small Farm Tractors
(3) Medium Farm Tractors
(4) Large Farm Tractors.

7.11 A garden tractor includes two-wheeled walking or riding tractors with very small H.P. engines on gasoline or power kerosene. These tractors can be successfully employed in Kitchen Gardens, compound gardens and market gardens where tillage is to be done in a very small area. They can also be employed for row

crop work on general farms.

7.12 Machines equipped with engines developing 15 to 25 H.P. power and which can pull 2 to 3 furrow ploughs 8'' to 1o'' deep, come under the small farm tractors. Such tractors are multipurpose units in as much as they can be employed for various farm operations including intercultivating transport and irrigation. Row crop models in this class of tractors have helped the sugarcane and cotton growers to minimise the costs of operations considerably. Small farm tractors can very efficiently take care of farm of 1oo to 35o acres. Puddling in wet land is another speciality of the high clearance tractors.

7.13 Medium farmtractors are available in wheel as well as crawler type. Crawlers can be successfully for breaking virgin land, pulling logs of wood in forests, road making and earth moving purposes. They cannot be used for swift transport jobs. Contrary to this, the medium wheel tractors are efficiently employed for all odd bobs. They can take care of an area over 3oo acres.

7.14 Large farm tractors are usually crawler type. They are meant for heavy jobs like land reclamation, sugarcane farming, earth moving, road making, excavating and haulage of forest produce and felling trees in clearing jugles. These tractors develop 6o H.P. and above.

7.15 Wheel type tractors have two distinct ranges. Standard models and Row Crop model. The standard models are the only ideally suited machines for all the odd jobs on the farm. They are able to perform operations from ploughing to harvesting and carrying the seasonal produce to the market or the godowns. They cannot

be used for intercultivation. The Row Crop models may be with wide fron axle ar tricycle type front wheels. This difference is made in the front wheel assembly for intercultivating purposes. The rear wheels are also adjustable according to the row crop spacing. The wheels are of large diameter and thinner which facilitates passin(over the crop for weeding and earthing up operations. Such tractors have found scope in sugarcane farms and cotton tracts, and vegetable cultivation. For the laborious and expensive jobs like interculture haudraulically operated tool bar with sets of cultivating attachments are attached to the tractor which is controlled by the operator by lift-all attachment.

CAPITAL REQUIREMENTS INVOLVED IN POWER-FARMING

7.16 After a brief description of the important types of tractors, it should be seen whether the replacement of bullock power with tractor involve an addition of capital outlay or not. The general impression is that introduction of tractorisation raises markedly the capital coefficient. Given below is an example of cost comparison between ploughing with a tractor and ploughing with 12 pairs of bullocks. In this example, the buying price of bullocks and the cost of labour, fodder etc. etc. are taken as lower than those prevailing in many parts of our country.[3]

3. The description of tractors and this cost comparison have been derived from an article by Sri A.K. Dwarkanath Iyengar, B.Sc. (Agri.), F.R.H.S. (London) appearing in ''Food and Farming'', July 1953.

Cost items	Tractor Rs.	Bullocks Rs.
Tractor and 2 furrow 12'' ploughs	1o,ooo	
12 pairs of bullocks + 12 ploughs 8'' bottom		1o,ooo
Depreciation	2,ooo (at 2o p.c.)	1,25o (at 12 1/2 p.c.)
Fodder and Concentrates (365 X 2 X 12)		8,76o
12 men at Rs, 5o/ per month		7,2oo
Fuel, oil, grease, waste 2oo days at Rs. 3o/ per day	6,ooo	
Driver at Rs. 3/ per day	1,o8o	
Total annual cost	1o,58o	17,71o
Total time worked per year	2oo days	2oo days
cost	Rs. 52-12-o	Rs. 88-8-o
Ploughing 8 - 1o'' deep with tractor and 6'' deep with bullocks	6 acres	6 acres
Cost per acre (Approx.)	Rs. 8-8-o	Rs. 14-4-o

LABOUR REQUIREMENTS UNDER POWER FARMING

7.17 The problem of labour requirements per acre under mechanised farming was studied at the Jahangirabad-Niblit State Mechanised Farm, Barabanki. The farm is not totally mechanised. It has two

tractors, and maintains 12 bullocks, one horse and some revenue producing livestock. Oneof the two tractors is H. D. Allischalmer 6o H. P. and the other small farm tractor Fordson 25 H.P.

7.18 HY D. Allischalmer (whose cost is about Rs. 75,ooo) ploughs 5 acres in 8 hours with Mecarnic Deering Mould Board Plough. It ploughs 2 acres in one hour or 16 acres in 8 hours, with one way disc plough. It harrows 2 acres in one hour with 22 disc harrow, that is, 16 acres in a day of 8 hours. Again it harrows 3 acres per hour, i.e., 24 acres per day of 8 hours with 36 disc harrow. 36 disc harrow is used for seed covering only, for it is not deep. As this tractor is very heavy, it cannot be used for interculture.

7.19 Allischalmer ploughs 16 acres in 8 hours, thus one acre will require only half an hour for ploughing once. Two persons, one operator and one cleaner, are required for operating the tractor ploughing an acre with this tractor requires one labour-hour. Thus if land is ploughed and harrowed say 5 times before sowing, it will take about 5 labourhours per acre. In case of wheat, barley, gram, pea and kharif crops like maize, cottone etc. 5 labour-hours will be needed for soil and seed-bed preparation. Soil and seed bed preparation for paddy will take about 4.6 labour-hours. One ploughing , one labourhour, 2 harrowings 1.6 l.h., 1 operation by puddlers 2 l.h. Similarly sugarcane will take about 5.5 labour hours.

7.2o Sowing can be done with the help of this tractor by attaching seed drills to it. About 15 acres can be sown in one day. Hence it will take about 2 labour-hours for sowing one acre of wheat and barley and about 4 labour-hours for cotton, maize, gram, and pea.

Sugarcane sowing involves a number of processes such as cutting the sugarcane from the field and then cutting it into pieces to be sown in the furrows. Allischalmer cannot be used for sugarcane sowing, but Fordson is used for this purpose. With the help of this tractor, it takes 21 hours to sow one acre of sugarcane. Weeding an interculture is usually done with the help of bullock-drawn cultivators or triangular harrows. At best, tractor can be used only once for inter-cultivating cotton, sugarcane and maise and there will be a saving of about 75 labour-hours. Harvesting and threshing is also done with the help of the small tractor Fordson. Harvesting of wheat and barley takes about 3 labour-hours per acre. Tractor-drawn reapers are not generally used for harvesting other crops. In advanced countries, there are machines for cotton picking (with rubber fingers) but they are unknown in India so far. There are also potato digging machines. Fordson can thresh one acre crop in 5 labour-hours.

7.21 The tables below give the labour-hour requirements per acre for growing major crops under non-mechanised farming as well under Jahangirabad mechanised farming. Data relating to non-mechanised farming is based on the normal working hours per acre for various operations as fixed by the Office of the Dy. Director of Seeds and Farms, Government of U.P.

Labour hours required per acre for performing various operation under non mechanised system of farming:

Crop > Operations	wheat	barley	paddy	Jowar+bajra and maize	sugarcane
Ploughing	12o	8o	7o	3o	13o
Sowing	4o	4o	4o	3o	11o
Weeding + Interculture	2o	2o	8o	4o	19o
Harvesting	1oo	1oo	1oo	5o	1oo
Threshing	16o	6o	1oo	4o	-
	44o	3oo	39o	19o	53o

Labour-hours required in performing various operations at the Jahangirabad Niblet Farm. Unbracketed figures relate to big tractors of 4o to 6o H.P. Bracketed figures relate to medium tractors of 2o to 3o H.P.

Crop> Operations Y	wheat	barley	paddy	maize/jowar	sugarcane
Ploughing	5 (15)	5 (15)	5 (15)	5 (15)	5.5 (16.5)
Sowing	1 (3)	1 (3)	4o	4 (12)	21
Weeding+ Interculture	2o	2o	8o	4o	155
Harvesting	31	31	31		
Threshing	41	41	41	9o	1oo
	35 (45)	35 (45)	132 (142)	139 (157)	281.5 (281.5)

RELEASE OF LABOUR POWER DUE TO POWER FARMING

7.22 Jahangirabad-Niblet Farm had an Allis Chalmer 6o H.P. and a Fordson 25 H.P. The unbracketed figures pertain to the Allischalmer except in case of paddy, where tranpplaning has got to be done by hand and sugarcane where Fordson could alone be used.

7.23 Total area under these crops in Uttar Pradesh in 195o-51 was (in acres); along with the percentage difference of labour hours required in farming with a big and a medium tractor over those required under non-mechanised system.

Crop>	Wheat	barley	paddy	maize/jowar	sugarcane
	7727128	4591o35	9113327	49o72o7	25o4541
Percentage release of labour-hour with big tractors in use	92.5o	89.oo	65.15	26.84	46.89
Percentage release of labourhours with medium tractors in use	89.77	85.oo	63.6o	17.37	44.81

7.24 The weighted percentage release of labour-hours works out to 69.14 in the farming operations when big tractors like Allischalmer are considered with 6o H.P. and 64.43 in case of tractors from 2o to 3o H.P.

7.25 Apart from this, there will be tremendous release from labour hours spent on the maintenance of draught cattle, It will amount to about 9o per cent of total human labour spent at the present, in view of the fact that one pair of bullock will have

to be kept per 1oo acres, even when complete mechanisation has been introduced, for purposes of making trenches and other tasks in cases of emergency.

7.26 Labour requirements under mechanised farming may differ from one region to region and from one pattern of crop combination to the other But there is no doubt that the release of labour power will not amount to less than 6o per cent of total human-labour time utilised in agriculture at the present. The prospects of such a high proportion of labour power being absorbed in agriculture or other industries are very remote and hence large scale mechanised cannot be envisaged at the present. And fortunately no responsible sections of the population excepting the dealers in tractors[4], make any plea for such mechanisation

PROGRESS IN POWER-FARMING

7.27 In recent days there has been tremendous progress in power farming. ''Development of power take-off- whereby the tractor's engine is used to drive subsidiary machinery or implements- and the wider use of two or three-point linkage- whereby a wide range of implements can be operated by the tractor as well as handled by it- has revolutionised power farming in Britain. Linkage has produced fundamental changes in the design of many farm implements; the exploitation of power take-off has mechanised even the subsideary tasks, traditionally hand-done, of hedging, ditching and the like.

7.28 ''Machinery, linked to and driven by tractors, is now bing made to dig ditches, mow grass, lift potatoes, cut hedges, spread lime and manure, saw wook, harvest sugar beet, mix concrete, compress

air, spray crops, dig post holes, bale straw, operate rotary hoes, load tractors and move earth. And these machines are bing made to satisfy not only the specialised demand of the farmer in Britain but also of farmer overseas[5]".

7.29 If power farming reaches such high levels, there remains little to be done with hand. Almost all farming operations can be undertaken and completed by the tractor operator, Such high degree of mechanisation will cause huge displacement of labour amounting to about 8o per cent of agricultural workers. Nay, still more, for in America such farm machines have already been devised that can do many jobs in one operation "An amazing new farm machine, in production at Houston, tenas, is reported to be able to plough, harrow, soil condition, seed and fertilise in one operation. It will reduce, according to its inventor, the time of the farm operation by 9o per cent. Estimated to cost over $ 125,ooo of conventional equipment and complete the work in a fraction of the time and at a lower fuel cost.

7.3o The pilot model, in use on the inventor's own 3oo-acre farm in Maine, planted an acre of potatoes in a single operation taking only 2o minutes. To do the ploughing, harrowing, soil-conditioning, seedin and fertilising with conventional equipment would have required about 3 days, he said"[6], This machine is called Wonsover. In Indian farming, completing all these opertions on a 3oo acre farm for sowing potatoes might take at least 6ooo lahourdays, i.e,, about 2,88o,ooo minutes. It means 144,ooo times or more than one lakh times the amount of labourtime that was requred by this ghost machine, Wonsover. Even the stunchest proponent of mechanised farming will be alarmed at it.

4. One may refer to a few issues of Food and Farming, New Delhi.
5.'Progress in Power Farming, Statesman, May 23, 1956.Engineeringfeatur
6. Stateman dated

Chapter eight

FLUCTUATION IN AGRICULRTURAL

SEASONAL AND CHRONIC ASPECTS

8.o The extent of employment of a worker may or may not remain constant on all working days of the year. On a number of days his employment may be nil or less than the normal working hours. If the worker gets less hours of work than the normal on all days, then he is chronically underemployed to the extent of the minimum proportion of labour-time that remains unutilised on all working days. But if he is subject to fluctuating under-employment so that he is fully employed on some working days (or even on one working day), all his underemployment is seasonal. The chronic underemployment accounts for the extent of minimum unemployment which a worker undergoes on any working day of the year. If a worker gets at the most 7 hours of work during a year whereas the normal working hours are 8 hours, the degree of chronic underemployment is 1/8. The rest of the underemployment is seasonal.

8.1 The same analysis may be extended to the case of an industry. All the underemployemt. prevailing in an industry may be divided in the two broad categories of chronic and seasonal. Chronic underemployment of any type is the minimum degree of underemployment of that type which the labour-force of the industry suffers over a certain period throughout the year, the rest is seasonal; e.g.,

if the degree of visible underemployment is U and the minimum 'daily' underemployment is U_c, then $U - U_c = U_s$ is the seasonal underemployment. Our reference period may be, instead of 'daily', weekly or monthly or even quarterly. The same applies to other types of underemployment, invisible and potential.

FLUCTUATION IN AGRICULTURAL EMPLOYMENT

8.2 In agriculture, the labour-requirements are highly oscillating; during busy period, agriculture provides many times more employment than during the off-seasons. Oscillations in labour-requirements do not occur in agricultural industry alone. 'In a non-agricultural economy, something similar to this is expected in the casual employment of workers like dock labourers. In Great Britain, for example, before 'decasualisation' of the dock labourers became effective, sporadic periods of full time work alternated with those of absolute idle-ness, but the entire labour-force was permanently attached to the occupation'[1]. Beveridge has remarked that before the First World War 'the actual leakage of labour-power through irregularity of employment is more than that involved in the fluctuation of the industry as a whole'[2]. The problem of seasonal unemployment involves a much larger number in countries like India, and the wastage involved is much more than in Industrial countries.

8.3 Some degree of seasonal unemployment is of course unavoidable in agriculture so long as it cannot be made completely independent of climatic factors, and no country, agricultural or industrial, has been able to escape it. Woytinkits[3] estimates for American

1. W. Beveridge: Unemployment, A Problem for Industry, 193o, p. 1o3.
2. Ibid, pp. 2o3.
3. Woytinski; 'Seasonal Variations in Employment in the U.S. 1939, p.73

agriculture showed a difference of 3.5 to 4 million workers between the 'Seasonal high' and the 'Seasonal low'. The Brookings[4] Institute drew attention to the extensive seasonal unemployment in the American cotton belt. In the East European countries seasonal factors waste about one third of the total output capacity.[5]

EMPLOYMENT IN VARIOUS AGRICULTURAL OPERATIONS IN U.P.

8.4 In Indian agriculture, it is the age old methods and farming practices that are largely followed even today. These methods are very prolonged and highly wasteful of labourtime. The following table gives the days of employment in various agricultural operations in the United Provinces.[6]

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4. Brookings Institution: 'American's Capacity to Produce', 1934, pp. 39.
5. R. Bicanic: 'Excess Population' The Advancement of Science, 1942; Vol. 2, pp.141-45.
6. Rural Wages In U.P. (Allahabad: Government of U.P., Department of Economics, and Statistics 1947) pp. 115.

Region	Type of holding	plough-ing+ sow-ing	Irri-gation	Trans plant-ing	Weed-ing	Hoe-ing	Reap-ing+ Thres-shing	Total per annum	No. of un-employed days.
North-west	1.1o acre canal irrigated holding	1o9	47	1	34	15	73	279	86
	2.1o acre un-unirrigated a. whest tract	136	-	-	23	12	92	236	1o2
	b. Non-wheat tract	47	-	-	6	1	64	118	247
Central	1o or 5 acre irrigated or non-irrigated a.wheat tract	114	38	13	16	6	68	255	11o
	b.non-wheat tract	79	11	3	12	1	56	162	2o3
Eastern	5 acre a.irrigated	81	36	9	2	8	37	173	192
	b.unirrigated	56	-	1	12	3	44	114	251

8.5 According to a recent survey man casual worker could secure employment for 23o days in agricultural and non-agricultural labour. The following table shows the percentage of man-days worked for wages and the number of days worked per worker for wages.[7]

7. Agricultural Labour Enquiry; Ministry of Labour, Government of India, 1954, Vol. II, North India (Uttar Pradesh) pp.

Operations	Percentage of mandays worked by men workers for wages	No. of days worked per man worker for wages.
Preparatory operations	11.5	31
Ploughing	24.5	73
Sowing	8.3	27
Weeding	8.2	29
Irrigating	9.7	36
Harvesting	14.3	42
Non-agricultural labour	13.2	5o

8.6 From the above tables, the order of employment in agricultural operations, from the viewpoint of employment, seems to be as follows. 1. Ploughing, 2.Harvesting, 3.Preparatory operations, 4.Irrigation, 5.Sowing, 6.Weeding.

8.7 It may be, thus, inferred that the peakload of work is highest in ploughing and lowest in weeding, and that the scarcity of labour is felt in various operations in the same order as given above. This, however, is not the actual situation. Although, the total number of days worked per worker in ploughing are highest followed by preparatory operations, it should be observed that ploughing and preparatory operations are spread over a considerably longer period. Ploughing for Rabi crops like wheat continues for about four months and that for Kharif crops spreads for a smaller period, for the latter require comparatively smaller amount of preparatory operations. On the contrary, harvesting period is very limited for both Rabi and Kharif crops and the intensity of agricultural activity is very heavy during harvesting peaks.

8.8 It is generally observed that peakload of work is heaviest and and scarcity of labour highest in harvesting of Rabi and Kharif crops followed by transplanting of paddy (in paddy growing areas), sowing, ploughing, irrigation, weeding and interculture in descending order.

COMPARISON OF EMPLOYMENT FLUCTUATION UNDER MECHANISED VS. NON-MECHANISED FARMING.

8.9 In order to compare the fluctuations in employment under mechanised versus non-mechanised farming data of employment of two agricultural farms, one of which is non-mechanised and the other mechanised were studied. The latter was not fully mechanised; it had a few pairs of bullocks as well. The study had to be based on a semi-mechanised farm, owing to the fact that there is no completely mechanised farm in Uttar Pradesh.

8.1o The variation in daily employment was studied on the Government Agricultural Farm Kalai, Distt. Aligarh, from July 1954 to June 1955. The farm is completely non-mechanised; but it possesses almost all the bullok=drawn implements. The frequency distribution of number of days with reference to the number of workers engaged on the farm from July 1954 to June 1955 is given in the following table.

Number of workers	Number of days
o - 5	44
5 - 1o	o
1o - 15	1
15 - 2o	o
2o - 25	2
25 - 3o	2
3o - 35	11

Number of workers	Number of days
35 - 4o	4
4o - 45	18
45 - 5o	32
5o - 55	6o
55 - 6o	48
6o - 65	49
65 - 7o	59
7o - 75	31
75 - 8o	4

8.11 The variations in daily employment were also studied on the State Mechanised Jahangirabad Niblet Farm, Barabanki. The following is the frequency distribution of the number of days according to the number of workers employed. The data relates to June 1954 to July 1955.

Number of workers	Number of days
o - 5	o
5 - 1o	2
1o - 15	2
15 - 2o	47
2o - 25	76
25 - 3o	55
3o - 35	57
35 - 4o	4o
4o - 45	22
45 - 5o	19
5o - 55	23
55 - 6o	2o

Number of workers	Number of days
60 - 65	1
65 - 70	1

8.12 The data classified above has been represented graphically and attached at the end of this dissertation. From the two graphs it is quite evident that the employment oscillations on the non-mechanised Government Agricultural Farm, Aligarh (Kalai) are far pronounced than on the State Mechanised Farm of Barabanki (Jahangirabad, Niblet).

8.13 The standard deviations of the number of workers employed daily on the non-mechanised Government Agricultural Farm and the State Mechanised Farm during the agricultural year 1954-55 were derived from the above data. They are respectively, 2[illegible] and 11 (approx.). This shows that the oscillation in the number of labourers employed daily is greater on the non-mechanised farm than on the mechanised. This must be so, for the labour-consuming operations by hand with hand tools hake many times longer time to be completed than by power machines. The above illustrative data supported by obvious logical reasoning goes to establish the fact that the fluctuations of employment under mechanised farming will be much less than under the non-mechanised.

8.14 The fluctuations, as has been mentioned, depend on the pattern and timing of cropping. In case of paddy, the possibilites of mechanisation are not so great as in case of wheat and barley. In case of paddy, the possibilites of mechanisation are not so great as in case of wheat and barley. So far, there has not

been developed any mechanised farm of transplanting. So during the period of transplanting,in the rice growing regions, the labour requirements are very high and scarcity of labour is keenly felt. Labour-requirements are also high during the sowing and harvesting seasons, but during the rest of the rice growing they are low. Thus the **fluctuations** of employment are likely to be very great in rice growing areas, less in wheat growing areas, still less in double cropping areas and very little in double cropping areas combined with mixed farming.

EMPLOYMENT STATISTICS COLLECTED BY THE ECONOMICS AND STATISTICS DEPARTMENT GOVERNMENT OF UTTAR PRADESH

8.15 Department of Economic Intelligence and Statistics of the Government of Uttar Pradesh has been collecting employment statistics since July 1954. From July 1954 to June 1955, these statistics were collected for all rural occupations together. Firstly, the number of workingdays during the month were determined. Secondly, the percentage of Effective Labour Force (E.L.F.) to to tatal labour force was found out. Thirdly the employment situation was classified in three categories.(1) full employment (2) complete unemployment (3) underemployment. Fourthly, loss to the under-employed was measured by the percentage man-hours lost on the basis of days completely lost and manhours lost on working hours. Finally, the percentage loss to the state from unemployment and underemployment of the tolal working hours was calculated. The following are the estimates arrived at by the department.

RURAL EMPLOYMENT IN UTTAR PRADESH

Month with working days	Occupational classes	ELF/TLF=100 (β)	Full-employment ELF=100 (α)	Complete Unemployment. ELF=100 (α)	Underemployment ELF=100 (α)	Loss to the Underempl: Man-hours EWH=100 (δ)	Days completely lost WMD=100 (δ) (ε)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
July '54 (28)	ADC	96	36	3	61	3o	19
Aug, ''	''	96	38	4	58	31	15
Sept. ''	''	95	3o	4	66	31	17
Oct.(27)	B'	97	44	2	54	28	17
Nov.(28)	''	97	39	2	59	3o	19
Dec.(''	''	96	37	3	6o	32	16
Jan'55 (28)	''	95	29	3	68	34	17
Feb. ''	''	95	3o	3	67	34	16
March (27)	''	95	43	2	55	25	16
April (28)	''	96	42	3	55	29	18
May ''	''	96	27	5	68	37	19
June ''	''	97	3o	3	67	31	14

α. ELF= Effective Labour Force β= Total Labour Force δ. EWH=Expected Working Working Man-Days. ϵ. WD=Working Days. γ. TEWH= Total Expected Working Hours.

(A note on the Methodology of Measures of Rural Employment and Unemployment appea the Bulletin of Statistics, Economics and Statistics Department, Government of U

8.16 From table, Appendix X, it is apparent that the total loss to the State from unemployment and underemployment was highest in the month of May, i.e., 29 per cent of the total expected working hours. It was lowest in the month of March, i.e., 15 per cent. The extent of underemployment varied in between these two limits during other months. They can be arranged in increasing order of underemployment in the following way:

Month	The extent of Rural Underemployment	Order of Magnitude
1954 July	21 per cent.	6
'' Aug.	22 ''	5
'' Sep.	25 ''	3
'' Oct.	17 ''	9
'' Nov.	2o ''	7
'' Dec.	22 ''	5
1955 Jan.	26 ''	2
'' Feb.	26 ''	2
'' March	15 ''	1o
'' April	19 ''	8
'' May	29 ''	1
'' June	23 ''	4

8.17 The extent of underemployment is lowest in the month of March in which the harvesting of Rabi crops takes place. Some part of harvesting and threshing of these crops extends to April, hence the degree of underemployment is very low in that month also. In the month of October, harvesting of Kharif crops takes place, some of which may extend to November also, hence the degree of underemployment is very low in October and moderately low in November. In

the month of November, sowing of Rabi crops also takes place. Extent of rural underemployment is moderately low in the month of July and not very high in the month of June. This is because of the fact that the sowing of Kharif crops takes place partly in June and mainly in July. In the months of August and December, weeding and interculture of Kharif and Rabi crops is done and the Rabi crops are irrigated. This prevents the rural underemployment from assuming very high magnitude or order in the months of December and August and so it is not as high as in the months of September January, February and May. The latter months are slack periods and there is no important agricultural activity that is undertaken besides cattle-keeping, watching of standing crops, and some preparatory operations. Fluctuations in rural underemployment occur mainly in the months of agricultural peaks or troughs of employment. For other rural occupations do not undergo seasonal variations of productive activity and employment as does agriculture. Fluctuations become more pronounced because of great dependence of Indian agriculture on rainfall which is proverbially precarious and uncertain.

8.18 The Department of Statistics and Economics of the Government of Uttar Pradesh changed the basis and concepts of the collection and compilation employment statistics from July 1955. The new series gives status of employment in details not only for various categories of households but also for the different regions separately in which the state has been divided as well as for the State as a whole. These figures are being regularly published every month in the Monthly Bylletin of Statistics. A note on the methodology of the new series appeared in the month of November '55.

8.19 From the above table it is quite obvious that there is high degree of correlation between the fluctuations in employment of cultivators and agricultural labourers and the whole of the rural population.

8.2o This can be easily explained. Firstly more than 9o per cent of the rural population is connected with agriculture. Hence the employment of such workers is variable according to the labour-requirements in agriculture. Employment in other occupations is less subject to seasonal variations. But it must be noticed that employment situation in other non-agricultural occupations moves in sympathy with that in agriculture. Among a number of causes for this two may be mentioned. Firstly, during harvesting seasons of Rabi and Kharif crops, rural community as a whole becomes more prosperous, hence its demands for products particularly locally produced increased. Hence production and level of employment also increases, in non agricultural occupations. Secondly, while major agricultural operations are under way, services of various other classes of workers, such as blacksmith, carpenter, are needed. Hence these classes of workers have relatively greater degree of employment. Graph no. I depicts the ups and downs class-wise.

8.2o As among different regions, the fluctuations of employment seem to follow the same pattern in Eastern, Central, and Western regions. But in the hill regions the fluctuations diverge from the other regions. This may be because of differences in the crop pattern and the timing of various agricultural operations and seasons. Graph no. II depicts the various of fluctuations according to region.

DIVISION BETWEEN CHRONIC AND SEASONAL UNDEREMPLO

8.21 From the data for July 1954 to June 1955 that at least about 15 per cent of rural manpo throughout the year. That is the visible chronic ru ment is 15 per cent.

8.22 Monthly underemployment data from August 1955 to May 1956 gives breakdowns according to occupational classes. This reveals that monthly underemployment is lowest in the month of April for the cultivator class which is six per cent. Hence as regards cultivators, the minimum underemployment is 6 percent and hence the degree of chronic underemployment U_c = .06. The monthly underemployment of agricultural labourers is lowest in the same month, but it is higher than that of the cultivators; it is 1o per cent. Hence the chronic underemployment of agricultural labourers is .16.

8.22 But this inference is not perfectly correct. It can be true only if the peak period coincided with a month, viz., the Rabi harvesting season starts in all regions, on the Ist of April and ends on the 3oth and the employment is evenly distributed on all days of the month. The peak-load is not so well distributed over any month and it does not begin on the same date in all regions or in all parts of the same region, nor does it extend over a month in all cases. The peak-period, viz., harvesting starts generally in early March in Eastern U.P. and in the later part in Western U.P. There may occur a difference of 5 to 1o days in the commencement of harvesting even between two adjacent villages.

The harvesting season for Rabi crops may last for 15 to 3o days with some gaps between the harvesting of pea and gram that take place earlier than barley and wheat. Moreover, the work load during the the peak period is not evenly distributed. It is low in the beginning and rises slowly up, then it rises rapidly and reaches the highest point; then it gradually lowers down. This can be seen from the graph of the daily employment on the Government Agricultural Farm, Kalai.

8.23 The general experience in the countryside is that during the harvesting of Rabi crops, there is no surplus labour available for about a week. There is felt, on the contrary, a shortage of labour even though there takes place some immigration from outside and some persons who are normally out of labour force participate in harvesting. Two special surveys have been conducted under the supervision of the writer of this dissertation in the village Sarsol and Faridpur; they also reveal the same facts. Hence it it may be safely concluded that there is no chronic visible under-employment in the sense that during certain periods, all labour power is employed in various regions of the State.

8.24 If the chronic visible underemployment is zero, then, all the visible underemployment is accounted for by the seasonal type, according to the definition adopted here; hence,

$$U_s = U - U_c = U - o = U$$

That is, seasonal visible underemployment covers all visible under-employment in agriculture.

8.25 As regards the invisible chronic underemployment, it is not possible to state anything definite. Labour-requirements during the peak can be reduced by spreading out the work, through better organisation and by the introduction of better methods of production. If it is assumed that the harvesting peak can be spread over about a month, then it can be said that 15 per cent of the rural labour time and 8 to 1o percent of the agricultural labour time remains unutilised throughout the year. The spreading out of work may be effected through formation of work-groups which may undertake reaping and other agricultural tasks of all holdings in turn. The work should be ordered in such a way that those crops are harvested first that need reaping urgently, otherwise there will occur some loss of yield.

8.26 The peak load of work may be reduced also by introduction of labour saving hand or bullock-drawn tools. In harvesting reapers can be used with advantage, and in sowing, seed-drills; in weeding and interculture, cultivators and harrows can be used.

8.27 During the harvesting period, the peak-load of work is maximum and hence the underemployment is the lowest. It has been shown that reapers reduce the total labour time utilised in harvesting by half. It may be stipulated that one quarter of labour time available is regularly spent on the maintenance of cattle, watching of standing crops, and other preparatory operations. Thus about 6o per cent of labour time is utilised in harvesting ignoring overtime work and work done by immigrants. Now if the labour time utilised is halved by applying reapers in harvesting, then there will be an additional surplus of about 3o per cent. Thus the total invisib chronic underemployment will amount about 35 to 4o per cent.

8.28 But this degree of invisible chronic underemployment shall occur in only those parts of U.P., where no paddy is grown. In paddy growing areas, transplanting has to be done by hand as no improved method has yet been discovered. In major paddy growing areas therefore, invisible chronic underemployment may be nil or may amount 1o to 15 per cent only.

8.29 Potential chronic under-employment shall assume in any case a very high proportion. In the long run, when irrigation facilities have been well-developed, the transplanting operations may also be spread over longer durations, as there will be regular supply of water and the farmers will not have to rush for the transplanting, lest rain-water should dry up or there should be excessive rains. Reaping, interculture, threshing etc. may also be undertaken by power driven machines. In fact potential chronic under-employment, shall be only a bit smaller than the total potential chronic under-employment. The seasonal variations in employment will be greatly reduced. On the basis of the estimates in Chapter seven, it can be said that chronic potential underemploument shall vary from 6o to 8o per cent of the total labourtime employed.

8.3o In the end, it may be noted, '' if either the time-allocation of work or the occupational allocation of labour is taken as immutable, the relation between the two problems will appear in a light different from what we have noted. If the agricultural technique and the time-pattern of work are taken as absolutely fixed, and if there is full employment for the available labour-supply in the busy season, then the whole labour-force may be regarded as technically necessary for agriculture. Slack-season idle-ness has in that case, to be regarded as technically complementary to busy season work and it may be

argued that, under the given condition, there is no under-employment of labour.

8.31 ''That there is a labour=shortage and full time employment for available labour, even though for a few weeks,is, of course, a well-known experience in Indian Agriculture. One should not, however, argue from this that there is no ' surplus' agricultural population and therefore no structural problem. Under a given sturcture and techniques of production there is no definite norm for measuring the 'surplus' population. But when the techniques and the structure are considered under-employment becomes not a problem simply of time spread work but of comparative income opportunities or potentialities. So long as the annual income of the cultivators is lower than what it could be under a changed, but realisable set of conditions, the fact of full-time employment for part of the year does not alter the fact of the under-employment over the year''.[7] The present writer cannot improve the above statement which he completely endorses.

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7. B. Datta ''The Economics of Industrialisation''; 1952. oo. 72.

Chapter Nine

VISIBLE AGRICULTURAL UNDEREMPLOYMENT

in

I N D I A

9.o Underemployment is not a peculiar phenomenon of Indian agriculture alone, it has persisted in acute degrees in East European countries,[1] in years preceding the World War II. Estimates of the degree of underemployment in these countries varied from 25 to 45 per cent.[2] All the methods that were employed to measure underemployment are based on certain norms such as 'work-unit' or 'crop-unit' or 'per capita output' or 'disparity between agricultural and non-agricultural incomes'. It is also not clear whether the aim is to measure the actual surplus labour-power or that which would result according to the norms adopted. In India also, efforts have been made recently by some economists for measuring agricultural underemployment. But all of these estimates are based on the conception of 'work-unit' of cultivation.[3]

9.1 Thus the methods so far adopted for measuring agricultural under-employment have been very crude and arbitrary. No attempt has been made to estimate the degree of under-employment, by first

1. These are: Estonia, Latvia, Lithunia, Poland, Czechoslovakia, Rumania Hungary, Jugo-slavia, Bulgaria, Albania, and Greece.
2. Datta, B.; ''The Economics of Industrialisation''; The World Press Ltd. 1952, pp.82-9o. The book provides a summary of various attempts made by individual economists and Institutions to measure under-empl
3. (a) Tarlok Singh: 'Poverty and Social Change'; Longmans, Green and Co. Ltd., pp.25. (b) Gupta, M.L.; 'Problems of Unemployment in India' pp.25.

estimating the total amount of labour-time utilised in the industry in a given year, and the total amount of labour-time available. The concepts regarding different forms of underemployment have also not been clearly stated.

VISIBLE AGRICULTURAL UNDEREMPLOYMENT

9.2 Underemployment may exist in an industry in three forms: Visible, Invisible and Potential. Visible underemployment measure the proportion of surplus labour time in an industry to total labour time available.

$$U = \frac{W - E}{W} = 1 - \frac{E}{W},$$

where U is the degree of visible underemployment; W, the labour-time available; and E, the labourtime actually utilised. Invisible underemployment measure the proportion of labour-time, that would be released without reducing total output, to total labour-time utilised if such labour-saving techniques of production and organisation are adopted that do not involve any net addition of capital outlay. Potential underemployment refers to the labour-time that would be released when some fundamental changes in the techniques of production or organisational structure are introduced that involve a net addition of capital outlay. The main purpose of this chapter is to study the degree of visible underemployment in India which is of immediate concern to the people in general and to the planners in particular.

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4. See 'International Labour Review' June 1952 'Underemployment in South East Asia'

LABOURTIME AVAILABLE IN AGRICULTURAL INDUSTRY IN 195o-51.

9.3 The rural population in India[5] in 195o-51 was 294,81o,628. the percentage of earners, helpers and dependants to the total rural population was:-[6]

	Earners	Helpers	Dependants
Male	22.5	7.5	1.8
Female	6.9	9.o	13.9
Boys +Girls	1.o	2.4	35.o

9.4 The occupational structure of the rural labour-force, i.e., of earners and helpers is not identical with that of the families. This is shown in the following statement. For purposes of this classification, the occupation of the helper is taken to be that of the head of the family, whom he helps.[7]

	Land-owners	Tenants	Agricultural workers	Non-agricultural workers
Family occupation	26.6	25.7	3o.4	17.3
Occupation of labour-force	26.4	25.6	26.9	21.1

9.5 As the helpers are expected[8] to follow the family occupation, the occupational distribution of earners can be discovered by deducting the number of helpers from the total number of workers in each occupation. This is brought out in Appendix V, table VI. About

5. "Summary of Demographic and Economic Data 1951 Census". pp.35.
6. Rural Manpower and Occupational Structure; Government of India, Ministry of Labour, Agricultural Labour Enquiry pp.5o9, Appendix VI.
7. Ibid, pp. 19, Statement VII.
8. Ibid pp. 19 line 1.

26 per cent of the total number of earners had subsidiary occupations and the remaining had to depend only on the occupation, inadequate, though it may be.

Subsidiary Occupation of Earners[9]

All India

Main Occupation	Percentage of earners having subsidiary occupations.	Percentage of earners having the following subsidiary occupations			
		Ownership	Tenancy	Agricultural labour	Non-agricultural labour
Ownership	5.1	-	1.9	o.9	2.3
Tenancy	5.1	1.4	-	1.4	2.3
Agricultural labour	8.1	2.5	2.3	-	3.3
Non-agricultural labour and other non agricultural work	7.8	2.6	2.6	1.7	o.9
All earners	26.1	6.5	6.3	4.o	8.8

9.6 From the above table it is seen that the percentage of owners, tenants, and agricultural labourers having non-agricultural secondary occupations was 2.3, 2.3, and 3.3 respectively and that of non-agricultural workers haveing agricultural subsidiary was 6.9. It can be stipulated that about one-third of labour-time of a worker is utilised in the subsidiary occupation. It means that the percentage of labour-time of owners, tenants and agricultural labourers utilised in non-agricultural occupations was .77,.77 and 1.1 respectively and that of non-agricultural workers in agricultural work was 2.3.

9. Ibid pp. 21, Statement II.

On the basis of the above, the net number of agricultural earners can be calculated. The adjusted figures for agricultural earners are given in Appendix VI, table 2.

9.7 A male worker cannot work on all days of the year. On some days he is not able to work for reasons other than want of work such as ill health, bad weather, festival and festivities. It is assumed that a male worker can work on 35o days[1o] per year. If, as is the case in other industries, a week is taken of 6 days only, then a male agricultural worker can work for 3oo days only. A female worker who participates in agricultural work is assumed to work for 12o days in a year. A boy or girl worker is assumed to work for 15o days in agriculture; The assumptions are based on the findings of Agricultural Labour Enquiry[11] regarding agricultural labouring families.

9.8 The total number of labour-days available in 195o-51 in Indian Union was 3oo21821ooo on the assumption of 35o working days for men and 26536596ooo on the basis of 3oo. This has been worked out in Appendix V, table 3.

LABOURDAYS WORKED IN INDIAN AGRICULTRUAL INDUSTRY IN 195o-51

9.9 Labourdays worked in agricultural industry have been classified in 3 categories.

(a) Labourdays worked in growing main crops;

(b) Labourdays worked in growing other crops;

(c) Labourdays worked in the up-keep and maintenance draught cattle.

9.1o The estimate of labourdays worked in growing main crops are based on NSS contained in the schedule no. 2.1 of 5th, 6th and 7th

1o. This is based on the estimates made by the "Report on Intensive Survey of Agricultural Labour, Government of India, Ministry of Labour, Vol. I, All-India pp.42.

11. Ibid pp. 32 and 83.

rounds. Average number of labour-days worked for gro per acre were arrived at by dividing the total numbe labour-days worked for growing a major crop[12] by the acres under it for all the three rounds and for all the seasons. For minor crops, first an arithmetic average of labour days per acre wwas taken for all seasons and for each round and then a geometric mean was calculated after discarding the abnormal figures. This is shown in tables 4 and 5 of Appendix VI.

9.11 The number of labourdays worked per acre were then multiplied by the number of acres under each crop in 1950-51.[13] The total number of labour-days worked in growing main crops is shown in table 1, Appendix V.

9.12 The total number of labourdays worked in growing other crops[14] has been taken as the average of total number of labour days worked in the 5th and 6th rounds, for which alone data were available. This is shown in table 2, Appendix V.

9.13 The number of labour-days utilised in cattle services[15] were calculated on the basis of two and half hours per cattle per day or 114 labour days per year. The NSS gives very exaggeraged estimates amounting to about one labour day per cattle per day. Hence it could not be accepted, and the present calculation was based on the average labour-time spent for the up-keep and maintenance of one draught cattle on the non-mechanised agricultural farms in North India. This is shown in Appendix VI, table 3.

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12. Major crops are: 1.rice, 2.whest, 3.barley, 4.maize, 5.Jowar 6.bajra, 7.small millets, 8. ragi, 9.gram, 10.jute, 11.cotton, 12. groundnut.
13. Area under crops was obtained from 'Abstract of Agricultural Statistics' India 1953.
14. fruits, fuel-wook, fodder, other plants
15. Indian Livestock Census 1951, Vol II, Ministry of Food and Agriculture, Governement of India.

9.14 The total estimated number of labourdays worked in 195o-51 was:

	Labourdays(in ooo)
Main crops	8785328
Other crops	2133o22
cattle-service	7343766
Total	18262116

VISIBLE AGRICULTURAL UNDEREMPLOYMENT IN INDIA IN 195o-51

9.15 Total number of labourdays available in Indian Agricultural industry in 1951

$$W_1 = 3oo21821ooo$$

$$W_2 = 2653659 6ooo$$

where the subscripts 1 and 2 denote whether the number of working days for men has been taken 35o or 3oo per year respectively.

9.16 The total number of labourdays worked in 195o-51

$$E = 18262116ooo$$

9.17 The visible agricultural underemployment in India in 195o-51

$$U_1 = \frac{W_1 - E}{W_1} = .3917$$

$$U_2 = \frac{W_2 - E}{W_2} = .3118$$

This shows that visible underemployment was about 39.17 per cent on the assumption that a man worker works for 35o days a year and 31.18 per cent on the assumption of 3oo day.

9.18 Various authorities and institutions have tried to estimate agricultural underemployment in various countries. Appendix VII gives a summary of these attempts.

Chapter ten

ABSORPTION OF SURPLUS LABOUR-POWER

in

AGRICULTURAL INDUSTRY OF U.P.

EXCESS OF AGRICULTURAL LABOUR IN UTTAR PRADESH

1o.o In Uttar Pradesh, the agricultural industry suffers from large scale underemployment. Large number of workers find no work or insufficient work for most part of the year. The employment is irregular and intermittent. Alternative opportunities for employment are very limited. Even when a worker is employed, he produces much less than what he could do per hour of work, if he were to work with improved tools and under better organisation. The visible under-employment in 1951 amounted to about 27 per cent. Invisible underemployment was of the order of 9 percent provided only holdings of 1o or more acres are taken into consideration, and 26 per cent if improved techniques are extended to all holdings. As regards potential under-employment, it may rise to 6o to 8o per cent of the labour-time currently utilised.

1o.1 In case of visible underemployment, the whole of it is likely to be seasonal, invisible underemployment might consist of about 3o per cent of chronic underemployment, the rest being seasonal; and in potential underemployment, the seasonal element shall be reduced to a negligible degree, and the whole of underemployment

may be relegated to chronic type.

WAYS TO ABSORB SURPLUS LABOUR-TIME IN AGRICULTURE

1o.2 The problem which faces a planner and a social worker is how best to utilise the surplus labour-time available by absorbing the idle labour in agricultural and non-agricultural occupations that are available and others that can be created. All avenues have been discussed by individual thinkers as well as by committees organised by private institutions and concerns or appointed by State and Central Governments or sponsored by international institutions. These discussions are however very descriptive and very general in character. Attempt shall be made here to give some rough quantitive estimates of the extent to which additional labour-power can be absorbed in agriculture. These estimates shall give an approximate idea of the relative importance of various measures that can be adopted to rid the agricultural industry from the wide and deep-spread underemployment.

1o.3 Out of numeraous measures that can be suggested, the following shall be discussed here.

1. Land reclamation and prevention of erosion.
2. Double -cropping
3. Mixed Farming
4. Intensive cultivation
5. Establishment of demonstration centres
6. Establishment of repairs houses
7. Establishment of veterinary hospitals.

1o.4 Apart from agricultural occupations listed above, surplus labour-time available in agricultural off-seasons can be absorbed

in non-agricultural occupations, some of which are seasonal such as road construction and others which are not seasonal in the main but are amenable to be undertaken at suitable intervals, such as various cottage industries. These will be discussed briefly without any attempt to give quantitative estimates.

LAND RECLAMATION AND PREVENTION OF EROSION

1o.5 In the year 1949-5o, the Uttar Pradesh Agriculture Department conducted through the District officers a detaled enquiry into the nature of the area recorded as culturable waste in each district and the results may be seen in the following table.[1]

Particulars	Uttar Pradesh (in acres)
A. Area under culturable waste-land not available for immediate cultivation.	4515o46
B. Area under culturable waste land available for immediate cultivation but which could not be cultivated	2o99235
(a) Kans growth	8o776
(b) Threshing floors	9132o
(c) Malaria	4o575
(d) Floods	57?8o
(e) Lack of drains	35669
(f) Lack of water	375631
(g) Distance from Abadi	12o694
(h) Damage from wild animals	278593
(i) Other causes	988876

(cont.)

1. Area under culturable waste land that have been given have been quoted from: Census of India, 1951, Vol. II, Uttar Pradesh, Part I-A-Report pp. 267.

(c) Area under culturable wast land that can be brought under immediate cultivation after improvement besides the area given against B. 2789812

1o.6 In Uttar Pradesh there is about 8o,776 acres of land under Kans growth. This can be easily brought under cultivation after reclaiming it by means of tractors. In U.P. the total number of tractors used for agricultural purposes was ~~2548~~ 2548 in 1951 as against 826o in India. Out of this 177 were state owned and and rest 2371 privately owned. The State tractors are mainly used for land reclamation. The area to be reclaimed comes to about 5oo acres per tractor. It is thus seen that Kans infected area can be brought under cultivation without much difficulty.

1o.7 In India and so in Uttar Pradesh, major parts of the area is cultivated only once a year, and in each village, there are one, two or more places reserved for threshing purposes. These sites are useless excepting for the duration of the threshing season. When the areas covered by such sites all the State over is taken into consideration it comes to a sizeable figure of 91326 acres. This area can be very profitably utilised for cultivating purposes by performing the threshing operation on the cropped field itself.

1o.9 About 4o576 acres of land escapes cultivation because of malaria climate prevailing in the area. These areas can be made habitable by eradicating the danger of malaria by aerial spraying of D.D.T. and other measures that have now been discovered and tried to disinfect such areas.

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2. No. of tractors for agricultural purposes only:

	Total	Government	Private
India	826o	1324	6836
U.P.	2548	177	2371

(Source: Agricultural Situation in India, April 1953.)

1o.1o An area of 87,2oo acres goes uncultivated because of floods and additional 35,669 acres because of lack of drains. These areas can be brought under cultivation by constructing dams and channels and harnessing the rivers to prevent them from being flooded frequently.

1o.11 12o,649 acres of land is not cultivated just because of the fact that some tracts of land lie at a long distance from Abadi. Such tracts of land must be cultivated and they are likely to be automatically brought under cultivation as the safety of standing crops is assured and means of transport are developed and improved when the villagers become less fearful of constructing their houses independently at a distance from the main Abadi.

1o.12 375631 acres escape cultivation because of lack of irrigation. This area shall come under cultivation as the means of irrigation are improved and developed.

1o.13 278,593 acres are uncultivated because they are exposed to damages from wild animals. State should take a hand in this affair and safeguard such areas from the ravages of wild animals so that these areas can be brought under cultivation.

1o.14 938,876 acres have been recorded uncultivated due to unspecified causes. This may also be expected to be cultivated.

1o.15 Thus it can be expected that 2,o99,235 acres can be brought under cultivation during the course of the present plan period or the present and the next. Assuming roughly that about

1oo labourdays[3] shall be required per acre for cultivation, it can be expected that about 65o,ooo workers will be absorbed through land reclamation in about 1o years.

1o.16 An additional area of 2,769,812 acres can be brought under cultivation,,which is at present recorded under culturable waste land, shall provide additional opportunity for the absorption of about 99o,ooo workers.

DOUBLE CROPPING

1o.17 In India and so in Uttar Pradesh, major parts of the area is cultivated only once a year. Cultivated area in Uttar Pradesh and the percentage of area cropped more than once was as follows:-[4]

Year	Net cropped area (in oo,ooo)	Area cropped more than once (in oo,ooo)	Percentage of (2) to (1)
	(1)	(2)	(3)
1951-52	39o.7	84.2	21.6
1952-53	394.2	94.4	23.9
1954-55	4oo.2	96.3	24.5

1o.18 It is thus apparent that the double cropped area, although it is increasing, is less than one quarter of the total net cropped area. If the proportion of area cropped more than once is increased, the number of labourhours utilised in agriculture will be greatly increased

2. This is based on the ratio of total labourdays worked in 195o-51 agriculture of the State (which amounts to 4462o24ooo according the present calculations made in Chapter five) and the total gross area under cultivation in 195o-51 (which amounted to 4632o842 acres in the quinquinnium average for the year ending 195o-51. Vide Census of India 1951, Vol. II U.P. pp. 251, table 241)
4. Uttar Pradesh through figures 1952-53, Bulletin No. 34; Economics and Statistics Department, U.P. pp. 7.

1o.19 The area cropped more than once increases mainly with the irrigated area and the supply and use of fertilisers, Some of the crops such as Sugarcane and Arhar take almost a full year for their growth and maturity, the rest get ripened in 4 to 5 months' time from the date of sowing. In 195o-51, the total net cultivated area was 37144725 acres[5] out of which an area of 2,5o4,541 was under sugarcane. The total net cultivated area excluding sugarcane is thus about 34,ooo,ooo acres. Only one-fourth of this area is cropped more than once, the rest being cropped only once. Assuming that one-third of the total net cultivated area cannot be cropped more than once due to floods, scarcity of rains, infertility of the soil or the necessity of keeping fallow, it is stipulated that five-twelfth of the total net cultivated area or about 14,ooo,ooo acres can be brought under double cropping afresh. Assuming that about 3o additional labourdays shall be required per acre for double cropping an area, it is found that about 42,ooo,ooo labourdays or 1,4oo,ooo workers shall be absorbed in addition.

MIXED FARMING

1o.2o Average Indian diet is very deficient in milk and milk product meat, fish and eggs. The table below gives a comparison between a balanced diet and the average per cspita food consumption in India.[6]

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5. Census of India, 1951, Vol. II, Uttar Pradesh , pp. 251, table 241.
6. Health Bulletin No. 23, The Nutritive Value of Indian Foods and the Planning of Satisfactory Diets.

	Composition of balanced diet (in oz.)	Estimated availability for consumption in India	
		Prewar (average in oz.)	Post-war (average in oz.)
Cereals	14	16.3	13.o
Pulses	3	1.9	1.9
Leafy vegetables Roots+other vegetables	4 6	3.7	1.6
Ghee-vegetable oil	2	o.25	o.36
Milk and milk products	1o	7.3o	4.8o
Meat, fish +eggs	4	o.6o	o.4
Fruits + nuts	3	3.3o	1.9o
Sugar + Jaggery	2	1.6	1.5

1o.21 It can be seen from the above table that the consumption of estimated availability of food materials for consumption in India is far from adequate for the maintenance of good health. It is therefore, impetative that the composition of the average diet is improved.

1o.22 This improvement can be achieved without contemplating any structural change in the economy, by introducing methods of agricultural production, to remove invisible underemployment. From what has been discussed in the chapter six, it may be stipulated that for each 15 acres cultication there can be released one pair of bullocks. Hence there will be saving of fodder and chaff and food-grains that were consumed by one pair of bullock, which may be utilised for the consumption of milch cattle, i.e,, cows and buffaloes of good breed. From the statement given below it can be seen that a she-buffalo consumes almost twice as much grains as a cow, and more than double of a bullock.

1o.23 The Census Report gives the following statement showing the consumption of food-grains by animals in Uttar Pradesh for the Census year 1951.

	Consumption per head per year
1. Bulls	17.7
2. Bullocks	3.28
3. Cows	4.9
4. She-Buffaloes	8.2

1o.24 Dr. K. Kishen assumes that only 1o per cent of the cows and buffaloes are active and consume food-grains, the rest consuming only fodder etc. For the present calculations, however, the consumption of fodder and chaffs will have to be taken into account. Hence it is assumed that the State maintains about half the number of full-fledged buffaloes and cows equivalent to their total population of fodder, chaffs and other course food-grains.

1o.25 It can be assumed that a she-buffalo can be kept in place of two bullocks and one and a half cows are equivalent to one she-buffalo or two bullocks for matter of consumption of fodder and foodgrains. In 195o-51 the total area sown was 4o,1oo,o36 acres out of which 35 per cent forms part of holdings of 1o acres or more. Thus about 2,1o5,672 she buffaloes in milk can be reared. One she buffalo requires at least 114 labour-days (at the rate of two and half ~~labour~~ hours per day) per year. Thus the total number of additional labour-days utilised in agriculture would be about 235,ooo,ooo or about 8,oo,ooo workers shall be absorbed. If all the land is cultivated on a co-operative basis, so that all individual areas under one single management are more than 15 acres , then the total number

7. Ibid, Appendix V, pp. 474, table 3; Dr, K.Kishen, Chief Statisticia

of milch buffaloes released would go upto 6,o162o5 and so the total number of labourdays absorbed to 67o,ooo,ooo or about 2,ooo,ooo workers.

INTENSIVE CULTIVATION:

10.26 Intensive cultivation means the application of more factors of production to the same tract of land. In U.P., despite the density of population being fairly very high, the cultivation is generally extensive in the sense that the farmer generally does not apply as much of the factors as he should for obtaining maximum amount of production. Mostly, some of the factors are not applied at all.

10.27 Is is common practice in U.P. villages, not to apply any manures or fertilisers in production of coarse grains like Sawan, Mandua, Kaudu, and pulses, Grams, etc. They are seldom irrigated even if the crop is drying up due to shortage of water. In case of major crops like Rice, Wheat, Cotton, Sugar-cane, manures and fertilisers are applied to not more than 50 per cent of plots[8] of land. As regards the insecticides and fungicides, there use is

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7. Ibid, Appendix V pp. 474, table 3. by Dr. K. Kishen M.A. Ph. D. Chief Statistician to Government of U.P., Department of Agriculture.

8. This based on a hurried look into the filled in N.S.S. schedules and on personal observation.

conspicuous by absence. Less attentetion is given to construction of hedges and prevention of crops from wild animals and pests than it should be. Repairs and construction of dams etc. also is procrastinated from year to year. It is true that in majority of cases defective cultivation is due to lack of resources in the hand of farmers, but in considerable cases it is also due to negligent habits and a sense of unconscious fatalism, and ignorance.

10.28 Whatever may be the cause, if cultivation is made more intensive and a shift takes place from coarse grains to staple crops, the amount of labour-time required for cultivating one acre of land shall be increased and hence additional labour-time may be absorbed. If we assume that at least about 10 labourdays per acre will be needed for intensifying cultivation, it can be argued that about 390,000,000[9] labourdays or 1,300,000 workers could be absorbed in U.P. agriculture in addition, (according to cultivated area of 1951)

ESTABLISHMENT OF DEMONSTRATION CENTRES.

10.29 It is perhaps true that Indian farmers have inherited farming practices that have proved beneficial for ages. And so long as they are using the old methods of production, they have not to learn any new lesson. But modern tools and implements have resulted in great saving of labour-time and physical exertion. The introduction of these tools and implements, no doubt, release a sizeable proportion of labour-time that is actually being utilised. But a part of labour-time, thus, saved

9. The net area cropped in U.P. in 1950-51 was 39070000 acres Vide U.P. through Figures 1952-53, Bulletin No.34, Economics and Statistics Department, U.P. pp. 7.

May be reabsorbed by the establishment of demonstration centres that the State Government must start in order to educate the farmers in modern methods of farming, to supply manures and fertilisers, better variety of seed and teach their proper use.

10.30 The total net cultivated area in 1951 was 37,965,247 acres or 59320 Square miles. If we assume that one demonstration house shall be required per five Square miles, of cultivated area, it can be stipulated that about 118640 persons shall be absorbed if 10 persons per demonstration house are employed.

VETERINARY HOSPITALS.

10.31 In U.P. the death of veterinary houses is not less than that of hospitals. When the cattle catch a disease, it is the local medicines whose healing effect has never been tested are applied with dubious results. The number of veterinary houses was as follows:-[10]

1950-1951	222
1951-52	229
1952-53	229
1953-54	236

10.32 This shows that the number of veterinary houses is increasing very slowly. If we assume that a veterinary house shall be established in each 5 square miles under cultivation it can be said that about 59020 persons shall be absorbed on the rate of five persons per veterinary house.

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10. Uttar Pradesh Ki Sankhyakia Roop Rekha. Department of Economics and Statistics pp. 82.

REPAIR HOUSES

10.33 The establishment of repair houses will no doubt increase the employment there in, but it will replace part of the labour of local artisans, hence there would not be any substantial increase on net employment. But the establishment of repair house will increase the efficiency of tools and implements and the total productivity of the agriculture. As the local artisans can only repair the existing implements, the establishment of repair house is very esssntial. Or the same artisans may be trained to take up repairs of improved implements.

10.34 The following gives the summary of the labour-power that can be absorbed in various agricultural avenues:-

Avenues	No, of workers that can possibly be absorbed in agriculture.
1. Land reclamation	1,550,000
2. Double cropping	1,400,000
3a. Mixed farming(on holdings greater than 10 acres	880,000
3b. Mixed farming(after creation of minimum holdings of 10acres	2,000,000
4. Intensive cultivation	1,300,000
5. Establishment of demonstration centres	119,000
6. Establishment of veterinary hospitals	59,000
Total	6,428,000 or 7,228,000

10.35 This shows that about 6 million workers can be absorbed in U.P. agriculture still further. The total number of male workers estimated in chapter two is 12,620,359,,of female workers 4,801,092, and of boy and girl workers 1,043,491. Thus the total of all workers comes to about 15 and a half million.

10.36 From this it can be inferred that agriculture alone can absorb about 50 per cent of the existing number of workers in addition, the avenues discussed above are fully exploited. It has been calculated, as mentioned above that the degree of visible underemployment is about 27 per cent, and that of invisible underemployment 9 per cent (if only holding of 10 or more acres considered) and 35-40 per cent (if all holdings are taken into account), of labour-time actually utilised in agriculture. The latter comes to about 6.2 or alternatively 26 per cent of total labour power. This means that agriculture is itself capable of absorbing ultimately extent of labour power which was visibly or invisibly underemployed in agriculture in 1950-51.

10.37 But the population is increasing at a rate of 1.25 per cent per annum, and so is the number of workers. If the agricultural developments suggested above take about 10 years to be completed, then there will take place a rise of about 16 per cent and if it takes longer timeto achieve these developments then the working force would swell still further.

10.38 If we allow for power-farming the problem becomes very gigantic. About 60 to 80 per cent or 70 per cent of the total working forcewould become redundant and agricultural development would fail to absorb the potentially un- or underemploy ed persons. Power-farming , however, is not likely to be adopted in the near future.

10.38 Agricultural prosperity, however, will affect other sectors and there is likely to be accelerated progress in the establishment and development of secondry and tertiary industries.

10.39 From the point of view of employment and absorbtion of surplus, two sectors have stratagic importance,.(a) Development of transport (b) Development of cottage industries. These may be discussed briefly here. We shall not attempt to discuss general industrialisation which is a major prblem requiring separate treatment.

DEVELOPMENT OF TRANSPORT.

10.40 Whether lack of proper transport facilities is a serious bottleneck or not, in industrial production, its complete absence cuts at the very root of agricultural prosperity and rural uplift. The following few lines that have been borrowed from an article '' reveal the relevant facts.

10.41 ''India needs a net work of well-planned road to inter-connect food producing rural areas with marketing centres. At present, in most agricultural regions of the country no substatial efforts are being made to raise the per capita income by fruit and vegetable growing or through poultry and dairy products for the simple reason that the produce will deteriorate owing to the delay in marketing.

10.42 It has been estimated that over half of the total produce of fruits, vegetables, dairy and poultry in distant isolated agricultural region of India deteriorate for want of roads which ensures speedy transportion, This is a big loss for the country and the growers who are naturally forced to confine their farming operation to the sowing of main food crops. Only a few growers who are lucky enough to have national high-ways passing through their area have supplemented their income by sowing fruits, vegetables and such like.

10.43 A comparative study of agricultural developments on the land close to national high-ways and in isolated regions reveals that farmers have two to three times more income by fruits and vegetables sowing, and mixed farming compared to those whose very existence depends solely on main crops. An acre of land under vegetables or vegetable-seed production for example has given to the growers a net profit of Rs. 1,200 to Rs. 1,500 per acre whereas farmers depending solely on food crops can have at the maximum an average net profit of Rs. 150 to 200 per acre, calculating on the basis of todays' average paddy and wheat yield.

10.44 In India there are only 2,40,000 miles of roads in a total area of 12,10,000 square miles, or in other words only 0.20 miles of road per square mile whereas in U.K. there are 2.02 miles of roads per square mile and in U.S.A. 1.01 miles of road per square mile. The U.K. has thus 10 times more road milage per square mile, and the U.S.A. 5 times more than India.''

10.45 Uttar Pradesh does not fare better than other States of the Indian Union as regards the existence of transport facilities between rural areas and those between the rural and urban areas. The construction of new roads and the improvement of the existing ones is essential for speedy progress of agricultural and rural population. This will not only enable the villagers to produce goods at the farms but ~~surplus~~ also provide opportunities for absorption of surplus labour in secondry and tertiary industries such as small scale cottage production of goods, transporting, artisanship, wholesaling and retailing, small banking, and in numerous otherways. The effect of linking the villages with each other

and that with the cities would be cumulative. Agricultural prosperity would lead to urban prosperity and vice versa resulting into general prosperity and progress of the whole nation.

SMALL-SCALE INDUSTRIES.

10.46 Another problem which demands serious consideration is the establishment of new and the development of existing small scale hand industries. This subject has been discussed in detail by numbers of quarters and it is not intended here to add anything original. That small-scale cottage industries are specially suited to rural areas and agricultural households may be pointed here.

1.47 (1) Capital-output ratio of cottage industies is very low. The initial as well as total outlay of capital per unit of output is very little and within the capacity of all agricultural households whose incomes are above the average. The site required for the small-scale production does not require any additional construction. It can be located in any corner of the house.

(2) Labour-output ratio of cottage and small-scale hand-industries is very high, This is a very strategic point. The surplus agricultural labour can be gainfully employed in cottage industries. Cottage industies scope for all sexes of workers of all ages; household male, boys and girls can cooperate and produce.

(3) The tools and implements are locally available, in general. When the cottage industries are developed, employment in tools making and repairing industries will also increase.

(4) The raw materials used in most of the small-scale hand-industries can be locally produced. This will enable the farmers to divert the attention from the production of small and coarse grains to commercial crops, which will add to their incomes and employment.

(5) Production of cottage industries can be adjusted to agricultural off-seasons without any wastage of material or absolescence or deterioration of capital equipment, and without any danger of inflating over-head costs. For the cottage production requires very small stock of raw-materials and capital. This is a advantage; for in rural area during agricultural peak there is heavy demand for labour in agriculture which attracts labour not only from the neighbouring towns but from industries in distant places and cities. During peaks of harvesting and planting all labour-power would be switched on to agriculture. The village small industries can well afford to meet situation without any loss, by reducing the scale of work or stopping it during agricultural peaks and releasing labour-power. During agricultural off-seasons, however, the production in cottage industries will have to be in full swing, to engage idle agricultural labour-power.

(6) A number of cottage products, besides, having local market can command sales in distant parts of the country itself and also in foreign markets. The latter will enable the country to gain foreign exchange for expediting industrialisation besides developing trades and commerce in general.

(7) The cottage industries can serve as ancillary to large-scale machine production. They can produce small-parts of machine take up repairs etc; polishing and finishing, and packaging of finished goods; utilise scraps and left overs of large scale mechanical production. All this will go a long way in reducing the degree of rural underemployment.

RECOMMENDATIONS FOR DEVELOPMENT OF COTTAGE INDUSTRIES.

10.48 It is hard to think of the development of cottage industries without the wholehearted assistance and encouragement from the State The State must extend its assistance and provide facilities for the following:-

(1) Loans to workers on suitable terms preferably advanced against receipt of finished goods.

(2) Improved equipments.

(3) Technical advice for workers.

(4) Standard quality of raw material.

(5) Better wage-scales and working conditions.

(6) Protection from machine-made goods for a reasonable period.

EXPORT PROMOTION OF COTTAGE INDUSTRY GOODS

10.49 The following steps should be taken towards making products in sufficient quantity in standard sizes and of standard quality for export:-

(1) Supervision during production by person who knows and thoroughly understands the requirements and standards of overseas buyers.

(2) Inspection and grading of finished products with rigid quality control.

(3) Concentration on development of several lines of commodities which are produced in different areas.

(4) Delivery of goods for exports:-

(a) Orders to be filled on times with meticulous observance of the buyer's specification as to colour, number, quantity, quality patterns etc.- No subsitutions.

(b) Reorders of the same quality as the original one

(5) Styling for export should be developed through direct contact with buyers who are making the products. This can be accomplished through maintenance of sample display centres for export buyers, and through advisory marketing services.

10.50 '' In Western countries, Better Business Bureaux, Bureaux of Standards, Chambers of Commerce, Producers cooperatives, co-operative marketing Organisations, and many others, flourish and wage goods he wants to buy. In the end the customer decides the fate of any product. It has been found that standard quality, price and steady supply are absolute essentials.

10.51 '' It is suggested that the State should concentrate upon the development of products which have a market first at home and then abroad. Exports alone are no solution, though will help.

10.52 The function of the State should be to encourage the development of rural industries; to foster the production of quality products and quantity production methods, and to promote the distribution and marketing of products''[12]

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12. U.N.O. Technical Assistance Programme Survey of U.P. Handicrafts- NewYork, 1955 pp.38.

Appendix I

A Average number of human labour-days employed per acre cultivation for different crops.
in
UNITED PROVINCES

Name of crop	Season	Average labourdays per acre 5th round	6th round	7th round	Geometric mean of the three round
1. rice	Kharif	∝	52.71	49.4o	51.o3
2. wheat	Rabi	49.46	47.36	47.93	48.24
3. barley	''	4o.32	44.82	46.17	43.7o
4. Jowar	Kharif	21.7o	22.34	25.28	23.o6
5. bajra	''	18.9b	21.28	22.63	2o.38
6. maize	''	27.51	27.7o	41.17	31.54
7. Gram	Rabi	16.41	27.28	28.4o	23.34
8. Sugar cane	Kharif	87.59	81.81	128.43	95.o3
9. ''	Rabi	58.3o	113.27	12o.99	
9. Cotton	Kharif	44.54	47.25	66.17	51.83
1o. Mandua	''	76.88	62.o9	-	69.o9
11. Kandon	''	28.47	34.95	-	31.55
12. Sawan	''	4o.18	48.37	-	44.o8
13. Potato	''	135.28	117.12	-	122.88
''	Rabi	125.91	82.61	165.69	
14. Other vegetables	Kharif	39.93	117.o2	131.32	
''	Rabi	193.36	1o9.17	163.69	111.51
''	Summer	-	114.33	84.62	
15. Other food crops	Kharif	22.79	23.45	3o.19	

Appendix I

Name of crops	Season	Average labourdays per acre 5th round	6th round	7th round	Geometric mean of the three rounds
Other food crops	Rabi	14.31	15.35	23.14	37.13
''	Summer	31.54	67.45	154.oo	
16. Linseed	Rabi	3o.oo	1.81	8.97	7.87
17. Sesamum	Kharif	91.33	13.23	21.97	29.83
18. Rape+Mustard	Rabi	5.o3	8.36	19.16	9.31
19. Ground nut	Kharif	15.79	16.72	-	16.25
2o. Other Oil-seeds	Rabi	69.57	28.88	7.93	25.16
21. Hemp	Kharif	13.o7	11.48	7.81	1o.54
22. Jute	''	48.15	12.84	164.69	46.7o
23, Indigo	-				
24. Opium					
25. Tobacco	Kharif	186.oo	48.62	-	-
''	Rabi	95.oo	-	75.oo	86.22
''	Summer	162.93	25.5o	123.96	-
26. Other non-food crops		31.31			31.31

Appendix II

HUMAN LABOUR-HOURS SPEN ON CATTLE AND OTHER GENERAL SERVICES
on
NON-MECHANISED GOVERNMENT AGRICULTURAL FARMS
in
UTTAR PRADESH

Name of the farm	year	No. of cattle	labour-hours spent on cattle per year	labour-hour per cattle per day	labour-hours spent on general services				
					watching	cleaning	peon	water man	aggregate
1.P.O. Nigohie, Distt. Saharanpur	1950-51	8	1666	.56	2528	1624	n.g.	n.g.	-
	51-52	8	1524	.52	2904	1464	n.g.	n.g.	-
	52-53	10	2193	.60	2912	1456	n.g.	n.g.	-
	53-54	9	1656	.50	2616	1440	n.g.	n.g.	-
	54-55	8	2520	.86	704	1460	n.g.	n.g.	-
2.Nawab Ganj Distt. Bareilly	50-51	24	8500	.97	n.g.	n.g.	n.g.	n.g.	-
	51-52	24	8676	.98	n.g.	n.g.	n.g.	n.g.	-
	52-53	24	9172	1.05	n.g.	n.g.	n.g.	n.g.	-
	53-54	24	10104	1.15	n.g.	n.g.	n.g.	n.g.	-
	54-55	40	23440	1.61	n.g.	n.g.	n.g.	n.g.	-
3.Tinsuhi Distt. Mirzapur	50-51	20	1095	.15	n.g.	n.g.	n.g.	n.g.	-
	51-52	20	1095	.15	2920	n.g.	2920	2920	-
	52-53	20	1095	.15	2920	n.g.	2920	2920	-
	53-54	20	1095	.15	2920	n.g.	2920	2920	-
	54-55	16	730	.13	2920	n.g.	2920	2920	-
4.Banaras	50-51	14	13171	2.58	n.g.	n.g.	n.g.	n.g.	-
	51-52	13	18669	3.93	n.g.	n.g.	n.g.	n.g.	-
	52-53	13	15428	3.27	n.g.	n.g.	n.g.	n.g.	-
	53-54	12	8760	2.00	n.g.	n.g.	n.g.	n.g.	-
	54-55	11	7431	1.85	n.g.	n.g.	n.g.	n.g.	-
5.Lalpur Distt. Sitapur	52-53	10	4688	1.28	n.g.	n.g.	n.g.	n.g.	-
	52-53	10	4440	1.25	n.g.	n.g.	n.g.	n.g.	-
	53-54	10	4394	1.23	n.g.	n.g.	n.g.	n.g.	-
	54-55	10	5605	1.55	n.g.	n.g.	n.g.	n.g.	-

Appendix II
(cont.)

Name of the Farm	year	no. of cattle	labour-hours spent on cattle per year	labour-hours spent per cattle per day	labour-hours spe Watching	cleaning	p
6. Gwaldon	1950-51	4	339	.23	n.g.	n.g.	n
Distt. Garhwal	51-52	4	339	.23	n.g.	n.g.	n
	52-53	4	339	.23	n.g.	n.g.	n
	53-54	4	339	.23	n.g.	n.g.	n
	54-55	4	339	.23	n.g.	n.g.	n
7. Amrokh	52-53	15	5978	1.10	n.g.	n.g.	n
Distt. Hardoi	53-54	14	10043	1.96	n.g.	n.g.	n
Distt. Jhansi	54-55	16	10758	1.84	n.g.	n.g.	n
8. Hardoi	50-51	10	3780	1.04	n.g.	n.g.	n
	51-52	10	6118	1.68	n.g.	n.g.	n
	52-53	10	4330	1.19	n.g.	n.g.	n
	53-54	10	3436	.94	n.g.	n.g.	n
	54-55	10	3626	.99	n.g.	n.g.	n
9. Gursahai Ganj							
Distt. Farukhabad	53-54	6	3244	1.48	n.g.	n.g.	n
	54-55	6	3336	1.52	n.g.	n.g.	n
10. M							
10. Meerut	50-51	14	7800	1.33	n.g.	n.g.	n
	51-52	14	7727	1.32	n.g.	n.g.	n
	52-53	16	6840	1.19	n.g.	n.g.	n

NOTE: n.g. stands for not given. Government Agricultural Farm Kalai, Distt. Al
personally. On this farm, human labour-hours spent on maintenance of cat
hours per day per cattle for the last three years.

Appendix III

VISIBLE AGRICULTURAL UNDEREMPLOYMENT
in

UTTAR PRADESH by
Natural Divisions
(in ooo)

Natural Divisions	Total labour-days of female boys+ girls	Total labour-days of male workers	Total labour days avail-able	Total labour days worked	Surplus labour-days	Percentage of surplus labourdays
1. Himalayan	148259	177502	325761	284902	40859	12.54
2. East Plain	539678	1308347	1848025	1422588	415437	23.02
3. Central Plain	538488	1140991	1688479	1103363	555116	34.65
4. West Plain	310093	1505488	1815581	1351625	463956	25.55
5. Hills ± Plateau	130302	275799	406101	299546	106553	26.24
UTTAR PRADESH	1666821	4417126	6083947	4462024	1621923	26.66
UTTAR PRADESH EX+ -CLUDING HIMALAYAN	1518562	4239624	5758186	4177122	1581064	27.46

Appendix IV

ESTIMATES OF SURPLUS AGRICULTURAL LABOUR-FORCE IN INDIA

Authority	Assumptions	Area to which the estimate applies	Year to which estimate re-
1.Nabagopaldas	work-unit of 10 acres has been assumed as the optimal holding which a cultivator can cultivate with the aid of his family and a pair of bullocks.	India (excluding erstwhile princely states)	Pre 1939
2.Tarlok Singh	"	"	Early 194
3. B. Datta	Full employment assumed on double-crop area, on the rest employment assumed to be 4 months only.	All India	1951
4.Moti Lal Gupta	Workunits of 5, 7.5, and 10 acres assumed according to fertility.	"	1954

Appendix V

Table 1.

OCCUPATIONAL DISTRIBUTION OF MEN, WOMEN AND CHILDR

(in unit)

Occupational distribution	All workers			Helpers			
	Men	Women	Children	Men	Women	Children	Men
Land owner	23349002	12374971	2646220	5881472	7057767	1881071	1746753
Tenants	22641456	11999972	2566032	5682475	6818970	1818392	1695898
Agri. worker	23791218	12609345	2696338	6721682	8066019	2150938	1706953
Non-Agri. worker	18661513	9890602	2114971	3825168	4590202	1224054	1483654

Source Rural Manpower and Occupational Structure; Government of I
Labour Agricultural Labour Enquiry pp. 509, Appendix VI.

Appendix V

Table 2

Earners in agricultural works adjusted for subsidiary occupation (in unit)

Occupational distribution	Agricultural earners		
	Men	Women	Children
Land owner	17350492	5281579	759029
Tenants	16845356	5146289	742631
Agri.worker	16881771	4493349	539401
Non-Agri.worker	341236	121909	20491
	51418861	15043126	2061552

Table 3.

Earners and helpers India (in unit)

Status	Men	Women	Children
Earners	51418861	15043126	2061552
Helpers	18285629	21942756	5851401
Total	69704490	36985882	7912953

Table 4

Labour days (in 000) available

Men (according to 350 days)	....	24396572
Men (according to 300 days)	....	20911347
Women (according to 120 days)	....	4438306
Children (according to 150 days)	....	1186943
Total labour days available- ist set		30021821
2nd set		26536596

Table 1.

Appendix VI

Table 1

LABOURDAYS REQUIRED FOR CULTIVATION OF MAIN CROPS

(NATIONAL SAMPLE SURVEY: 1950-51
ALL INDIA)

Name of crop	Human labour-days per acre	Total acreage Under each crop (in 000)	Total human-labourdays (in 000)
1. Rice	39.12	76135	2983731
2. Jowar	14.36	38447	552099
3. Bajra	11.57	22296	257965
4. Maize	33.12	7807	258568
5. Ragi	36.12	5444	196637
6. Small Millets	21.44	11380	243987
7. Wheat	33.26	24082	800967
8. Barley	41.76	7693	321260
9. Total cereals	-	193314	-
10. Gram	19.17	18706	358594
11. Tur or Arhar	16.66	5389	89781
12. Other pulses	21.46	23080	495297
13. Total pulses	-	47175	-
14. Sugarcane	153.03	4217	645328
15. Potato	129.48	592	76652
16. Tobacco	79.22	883	69951
17. Sesamum	14.33	5445	78027
18. Groundnut	19.74	11106	219232
19. Rape+Mustard	17.00	5118	87006
20. Linseed	17.19	3467	59598
21. Castor seed	10.41	1372	14283
22. Jute	55.90	1411	78875
23. Cotton	19.14	14536	278219
24. Spices (ginger, piper and chillies)	38.78	1702	151104
25. Mesta	28.58	484	13833
26. Others	44.32	-	454334
Total	-	-	8785328

Source: Col. 3. National Sample Survey, Government of India

Col. 4. Abstract of Agricultural Statistics, Government of India.

Appendix VII

Table 2

(All India)

PRODUCTION COSTS FOR AGRICULTURAL PRODUCE (other crops)
(BLOCK - 17)
(Human labour days)

Round	Human labour days (000)			Average of 5th and 6th Rounds
	hired	household	combined	
5th Round	170759	2208589	2379348	2133022
6th Round	263205	3510188	1886696	

Appendix VIII

Table 3

SERVICE CHARGE FOR LIVESTOCK
(human labour days)
(in 000)

Cattle	No. of working Buffaloes	Total	Man days Per bull	Total man days required
58413	6006	64419	114	7343766

Source. Indian Livestock Census 1951, Vol. II, Directorate of Economic and Statistics; Ministry of Food and Agriculture; Government of India.

Appendix VI

Table 4

National Sample Survey
(All India)

LABOURDAYS REQUIRED PER ACRE SOWN & H

for
MAJOR CROPS

(all seasons combined)
5th, 6th & 7th r o u n d s .

Name of crop	Human labourdays				Area sown			
	5th	6th	7th	Average	5th	6th	7th	Av
1. Rice	1916563	2466730	2755555	7138838	58469	63110	64386	18
2. Wheat	496771	704434	830235	2031540	16493	21339	23931	6
3. Barley	249754	326368	421286	997408	6857	8269	9540	2
4. Maize	158843	220765	262730	642338	5927	6511	7463	1
5. Jowar	347735	514314	652206	1514255	27485	35480	46042	10
6. Bajra	212515	309363	400081	921959	24433	29132	35132	8
7. Small millets	65465	131266	145249	341980	4929	5229	6601	1
8. Ragi	140508	202104	248039	550651	4132	5235	5769	1
9. Gram	180406	275281	270098	725785	10899	14067	13411	3
10. Jute	63702	62361	94440	220503	1524	1373	1140	
11. Cotton	153514	250592	324559	728665	9883	12734	15865	3
12. Ground nut	107372	149061	172187	428620	7671	6377	8003	2

Appendix VI

Table 5.

HUMAN LABOURDAYS REQUIRED FOR PER ACRE SOWN UNDER MINOR CEREAL

(5th and 6th round and average)

Name of crop	human labourdays required per acre					
	Kharif		Rabi		Summer	
	5th round	6th round	5th round	6th round	5th round	6th
1. Tur or Arhar	19.22	∝ 9.26	18.88	13.34	-	15.2
2. Other pulses	19.96	10.89	30.92	18.63	23.00	25.3
3. Sugar-cane	190.67	123.36	∝ 246.30	145.08	∝ 1493.43	∝ 264.6
4. Rape and musrard	∝ 44.61	∝ 8.25	13.44	20.55	-	-
5. Sesamun	20.96	10.94	16.37	9.06	-	∝ 2.5
6. Castor	11.37	10.35	11.66	8.29	∝ 99.00	-
7. Linseed	27.41	18.21	14.75	8.39	-	-
8. Potato	147.67	115.92	113.81	140.54	∝ 330.71	-
9. Spices	121.61	65.50	66.31	59.23	131.25	∝ 180.7
10. Tobacco	131.56	70.40	35.25	66.37	51.00	120.7
11. Mesta	30.73	26.43	∝ 42.38	∝ 5.12	∝ 196.00	-
12. Others	72.23	24.77	80.82	19.91	23.88	∝ 102.9

∝ figures are not taken in calculating the avera

Appendix VII

ESTIMATE OF UNDEREMPLOYMENT BY VARIOUS AUTHORITIES & THEIR A

Authority	Basic Method	Region & Year
1. European Conference on Rural Life.	'Standards of Life' & 'Optimal holding' On the assumption of a mixed husbandry and premominance of cereal crops, about 12.4 acres might be taken as the family unit. In a family of five with two workers this means 2.5 acres per head and 6.2 acres per worker	Sub-Carpathian low lands of Poland & East European countries; 1939
2. R.Bicanic; 'Excess population '; Advancement of Science, Vol.II, 1942, No.6 pp.141-45.	A decent living in peasant Eastern Europe was the standard which required about 3.1 acres of cultivated land.	East Europe 1942
3. Poniatowski, 'Le Probleme du surpeuplement dans l'agriculture Polonaise' L'Est European Agricole, 1936, No. 17.	Optimal holdings	Poland 1930
4. Oberlander; 'Die Agrarische Ubervolkerung Polens, Berlin 1935.	Optimal holding	Poland 1931
5. Egroff L. ofN. European Conference on Rural Life; pp. 21,62,76.	Optimal holding	Bulgaria 1936
6. Warriner, D. 'The Economics of Peasant Farming 1939, 62-68.	Suggested that the farm densities in Hungary and Czecholosokia rather than the West European Standard should be taken as the Standard for Eastern Europe.	East European Countries.

Appendix VII
(cont.)

Authority	Basic method	Region and
7. L.ofN. European Conference on Rural Life. pp.56-57.	norms as the degree of under-nutrition and even "cultural stagnation". It also considered the suggestion thatáa high proportion of arable land under cereals or other food crops might be taken as indiacations of an excessive pressure of land.	This percen pean Countr 40; Norway mania) in B total area ⅔ of cultiv
8. W.E.More; L.ofN. Economic Demography in E.&S.E.Europe, 1945, Chap.III & Appendix I; Also W.E.More; "Agricultural Population and Rural Economics in Europe" in Milbank Memorial Fund: Demographic Studies of Certain Areas of Rapid Growth; 1944 pp. 58-78.	A high agricultural density is accompanied generally by a low unit yield and, therefore, a calculation of excess population on the basis of a reduced farm density should take into account probable rise in the yield per head and per unit of land. Moore takes a composite crop basket or crop unit composed of wheat, rye, barley, oats, maize and potatoes, weighted in the proportion 16:9:10:6:53. Per capita production of crop unit in each country of Each country of East Europe is compared with the average European per capita output(Turkey&Russia were excluded for scarcity of data)	Eastern & S Eastern Eur 1945 Italy, Por & Spain 1
	A second method adopted by Moore was to take (1) French output per hectare and(ii) European output per hectare.	Hungry, Po Greece, Yo via, Ruman Bulgaria
9. PEP Economic Development in S.E. Europe, 1945, p. 39		Hundry, Po Greece, Yo Rumania&Bu
10. Mandelbaum, Industrialisation of Backward Areas 1945, p. 2.		"

Appendix VII
(cont.)

Authority	Basic Method	Region &
11. Rosenstein Rodan; "Industrialisation of E.&S.E. Europe" E.J. June-Sep. 1953 pp. 202-11.		Hungary, Po Greece, Yog Rumania & B Czechoslov Amstria, Al
12. M. Dobb; Soviet Economic Development since 1917 (1948) pp. 189-90.		U.S.S.R. 1
13. Lubny-Grecyks		U.S.S.R. 1
14. Mints	Time-budget	U.S.S.R.
15. B. Markus		U.S.S.R. 1
16. W. Cleland: 'The population in Egypt'; 1936. pp. 106	Without reducing the total products from land and without much more mechanisation than at Present.	Egypt 1936
17. W. Cleland in L'Egypte Contemporaraine, May 1939, quoted by D Warriner; Land & Poverty in the Middle East, 1948; pp. 33	In 1939, he showed that with the help the degree of mechanisation on American farms 10 per cent of Egypts agricultural labour force could produce the normal output.	Egypt 1936
18. Leonard Hsu: China's Economic Stabilisation & Reconstruction, 1948 pp. 8.		China 194

Appendix

Appendix VIII

LABOUR REQUIREMENTS EACH DAY ON KALAI

NON-MECHANISED FARM

1954-55

July 1954.

Date	m.m.	c.m.	c.f.	c.b.	total	seven days moving average
1	13	15	0	3	31	
2	12	15	0	3	30	
3	12	16	3	3	34	
4	12	16	0	3	31	32.2
5	14	16	0	3	33	31.3
6	13	16	0	3	32	31.6
7	13	18.5	0	3	34.5	30.1
8	13	18.5	0	3	34.5	27.6
9	12	17	0	3	32	25.9
10	12	9.5	0	2	23.5	25.5
11	13	0	0	1	14	25.7
12	13	6	0	2	21	26.0
13	13	13	0	3	29	25.3
14	14	18	1	3	36	24.4
15	14	17.5	2	3	36.5	24.1
16	14	9.5	1	2.5	27	23.8
17	13	2	0	2	17	23.5
18	14	3	0	2	19	22.5
19	14	33	0	2	19	21.8
20	13	12	0	2	27	23.4
21	13	14	0	2	29	26.4
22	13	15	0	3	31	28.3
23	13	7	0	2	22	29.7
24	14	12.5	9	2.5	38	30.1
25	14	14	0	4	32	30.7
26	15	11	0	3	29	30.9
27	15	11	0	4	30	32.2
28	15	14	0	4	33	30.9
29	15	13.5	0	4	32.5	29.9
30	14	14	0	4	32	27.7
31	14	10	0	4	28	25.4

NOTE: m.m. stands for monthly males, i.e., males employed on monthly basis. c.m. stnads for casual males, i.e., males employed on daily basis. c.f. and c.b. stand for casual females and casual boys respectively.

AUGUST 1954

Date	m.m.	c.m.	c.f.	c.b.	total	seven days movingavera
1	11	2.5		1.5	15	23.4
2	15	2		2	19	21.1
3	15	2		1	18	20.0
4	15	3		1	19.1	19.1
5	15	4		2	21	20.4
6	15	3		2	20	21.1
7	15	4		3	22	22.0
8	15	7		2	24	22.8
9	15	7		2	24	23.1
10	14	7		2	24	23.6
11	15	7		2	24	23.3
12	15	7		2	24	21.3
13	15	6		2	23	21.1
14	15	5		0	20	21.1
15	55	5		2	10	21.2
16	15	6		2	23	20.4
17	15	6.5		2	23.5	20.5
18	14	7		4	25	21.6
19	13	2		3	18	23.4
2o	13	8		3	24	24.1
21	13	11		4	28	26.8
22	8,5	10		4	22.5	29.2
23	14	10		4	28	31.5
24	14	24		4	42	32.9
25	14	24		4	42	33.6
26	14	15.5		4	33.5	35.6
27	14	15		5	34	36.6
28	14	14		5	33	33.8
29	14	17		6	37	32.0
3o	13	17		6	36	29.0
31	13	16		6	35	26.1

SEPTEMBER 1954

Date	m.m.	c.m.	q.f.	c.b.	total	seven days moving average.
1	14					
1	14	9.5	0	3	26.5	37.40
2	14	15	0	4	33	39.4
3	14	16	9	5	44	41.8
4	14	17	15	5	51	44.1
5	14	17	15	5	51	47.0
6	15	17	13	5	52	46.9
7	15	16	15	5	51	46.3
8	14	14	15	4	47	45.0
9	14	14	0	4	32	43.8
1o	15	16	3	6	40	43.1
11	14	16	6	6	42	42.4
12	14	16	6	6	42	42.9
13	14	23	6	5	48	43.4
14	14	21	6	5	46	45.1
15	15	18	12	5	50	43.4
16	15	17	0	4	36	43.3
17	15	21	12	4	52	45.0
18	15	12.5	(	2.5	30	45.5
19	15	20	12	4	51	45.2
2o	15	19	12	4	50	47.1
21	15	20	12	2	49	46.2
22	15	19.5	12	2	48.5	49.4
23	25	20	12	2	49	43.6
24	15	20	6	2	46	43.8
25	15	20	15	2	52	42.8
26	4	5	0	2	11	43.2
27	14	20	15	2	51	43.6
28	15	17	7.5	2	41.5	39.6
29	15	17	18	2	52	34.6
3o	15	17	18	2	52	38.4

OCTOBER 1954.

Date	m.m.	c.m.	c.f.	c.b.	total	seven days moving averag
1	15	02	0	1	18	35.0
2	15	1	0	1	17	37.1
3	15	1	18	1	35	35.1
4	15	5	24	1	41	30.9
5	14	6	24.	2	45	34.2
6	5	6	24	2	37	39.0
7	5	6	10.5	2	23.5	42.2
8	12	6	21	2	41	44.6
9	15	12	21	2	50	43.4
1o	15	20	21	2	58	46.0
11	15	20	21	2	58	47.9
12	15	19	0	2	36	50.3
13	15	17	21	2	55	50.6
14	15	20	0	2	36	50.3
15	15	20	21	2	58	50.6
16	15	15	20	2	52	52.9
17	15	20	21	2	58	52.5
18	15	20	21	2	58	56.0
19	15	15	20	2	52	54.7
2o	15	16.5	19	2	52.5	55.0
21	15	17	21	2	55	52.9
22	15	17.5	21	2	55.5	52.0
23	15	16	21	2	54.	46.7
24	15	16.5	21	1	52.5	42.0
25	15	17	9	1.5	42.5	41.8
26	3	1o	0	2	15	41.7
27	3	13	0	3	19	42.0
28	13	16	21	4	54	43.9
29	14	16	21	4	55	44.6
30	15	16	21	4	56	50.7
31	15	17	21	3	56	56.4

NOVEMBER 1954

Date	m.m.	c.m.	c.f.	c.b.	total	seven days moving averag
1	15	17	21	4	57	57.0
2	15	18	21	4	58	56.9
3	15	19	21	4	59	56.6
4	15	18	21	4	58	53.6
5	14	17	21	4	54	53.6
6	14	17	21	4	54	50.4
7	8	15	10.5	4	37.5	44.3
8	14	18	21	4	57	40.4
9	11.5	10.5	9	2.5	33.5	39.1
1o	4	10	0	2	16	26.1
11	8.5	10	4.5	2	31	35.4
12	15	14	13	3	45	30.1
13	15	16	0	2.5	33.5	31.1
14	15	14	0	3	32	35.4
15	15	8.5	0	3	26	37.4
16	15	19	0	3	27	37.4
17	14	10	16	3	43	36.9
18	14	10	18	3	45	38.8
19	14	11	19	3	47	39.9
2o	14	10	0	3	28	39.1
21	14	10	18	3	45	39.1
22	14	17	0	3	34	39.0
23	15	14	0	3	32	37.0
24	15	16	9	3	43	37.4
25	15	16	10	3	44	38.0
26	14	16	0	3	33	40.1
27	13	15	0	3	31	42.6
28	13	14	19	3	49	43.6
29	13	14	18	4	49	42.6
3o	13	15	18	3	49	42.1

DECEMBER 1955.

Date	m.m.	c.m.	c.f.	c.b.	total	seven days moving average
1	13	16	19	3	51	42.0
2	18	15		3	36	39.4
3	11	16		3	30	35.2
4	10	16.5		4	30.5	34.2
5	12	14		4	30	30.4
6	12	15		3	30	28.6
7	13	15		4	32	28.4
8	13	38		3	24	27.6
9	13	8		3	24	27.0
1o	13	12.		3	28	25.6
11	14	8		3	25	23.9
12	14	9		3	26	23.3
13	14	3		3	20	22.6
14	14	3		3	20	21.4
15	14	2		3	19	20.6
16	14	3		3	20	19.6
17	15	2		3	20	19.4
18	14	2		3	19	19.3
19	14	2		3	19	19.4
2o	14	2		3	19	19.4
21	14	2		3	19	19.4
22	14	2	1	3	20.	20.1
23	14	2	1	3	20.	20.7
24	14	2	1	3	20	21.4
25	15	4	1	4	24	22.1
26	15	4	1	3	23	22.6
27	14	6	1	3	24	23.3
28	14	6	1	3	24	23.9
29	13	6	1	3	25	23.9
3o	13	8	1	3	25	24.0
31	14	7	1	2	24	23.9

JANUARY 1955.

Da Date	m.m.	c.m.	c.f.	c.b.	total	seven days moving average
1	14	7	1	2	24	23.7
2	15	612	1	2	24	23.9
3	14	6	1	2	23	23.6
4	14	6	1	2	23	23.4
5	15	6	1	2	24	23.1
6	15	5	1	2	23	23.1
7	15	5	1	2	2 3	22.6
8	15	5	1	2	23	22.0
9	15	5	1	2	23	21.3
1o	15	1	1	2	19	20.7
11	15	1	1	2	19	20.1
12	15	1	1	2	19	19.4
13	14	1	1	3	19	18.7
14	14	1	1	1	19	18.6
15	14	1	1	2	18	18.4
16	14	1	1	2	18	18.4
17	15	0	1	2	18	18.7
18	15	0	1	2	18	18.9
19	15	1	1	2	19	19.0
2o	15	3	1	2	21	19.3
21	15	2	1	2	20	19.3
22	15	1	1	2	19	19.3
23	15	2	1	2	20.	19.1
24	14	1	1	2	18	18.7
25	14	1	1	2	18	18.4
26	14	1	1	2	18	18.4
27	14	1	1	2	18	18.1
28	14	1	1	2	18	18.1
29	14	1	1	3	19	18.7
3o	15	1	1	3	20	18.9
31	15	1	1	3	20	18.9

FEBRUARY 1954.

Date	m.m.	c.m.	c.f.	c.b.	total	seven days moving aver
1	15	1	1	3	20	19.1
2	14	11	1	3	19	19.3
3	14	1	1	2	18	19.6
4	15	1	1	3	20	20.7
5	15	1	1	3	20	20.7
6	15	1	1	3	20	22.4
7	15	1	1	3	20	24.0
8	15	7	3	3	28	25.1
9	15	10	3	3	31	26.3
1o	15	10	1	3	29	27.6
11	14	10	1	3	28	28.6
12	14	10	1	3	28	28.6
13	15	10	1	3	29	28.4
14	15	10	1	2	28	28.6
15	15	10	1	2	28	28.9
16	15	10	1	3	29	29.1
17	14	12	1	3	30	29.4
18	14	12	1	3	30	30.0
19	14	12	1	3	30	30.4
2o	15	12	1	3	31	31.3
21	15	13	1	3	32	32.0
22	15	16	.5	2	30	32.9
23	15	16	.5	4	35	33.6
24	15	16	.5	4	35.5	33.6
25	15	16	.5	4	35.5	33.2
26	15	16	.5	4	35.5	31.7
27.	15	12	.5	3	30.5	30.4
28	15	12	.5	2	29.5	29.1

MARCH 1955

Date	m.m.	c.m.	c.f.	c.b.	total	seven days moving average
1	15	3	.5	2	20.5	28.1
2	15	8		2	25	27.2
3	15	10		2	27	26.2
4	14	13		2	29	25.3
5	14	13		2	29	24.1
6	15	6	.5	2	23.5	22.3
7	15	6	.5	2	23.5	21.8
8	12	3	.5	2	17.5	21.1
9	4	2	.5		6.5	20.8
10	14	8	.5	1	23.5	21.5
11	14	8	.5	2	24.5	21.8
12	14	9	1.5	2	26.5	22.9
13	14	9	.5	3	26.5	23.2
14	13	9	.5	2	24.5	24.3
15	14	11	.5	3	28.5	23.3
16	13	3	.5	3	19.5	22.2
17	13	3	.5	3	19.5	21.8
18	13	3	.5	2	18.5	21.6
19	13	3	.5	2	18.5	20.9
20	13	8	.5	2	23.5	22.0
21	13	8	.5	2	23.5	22.9
22	13	8	.5	2	23.5	23.5
23	14	11	.5	2	27.5	24.5
24	14	9	.5	2	25.5	24.6
25	14	8	.5	2	24.5	24.6
26	14	9	.5	2	25.5	25.2
27	14	6	.5	2	22.5	26.0
28	14	7	.5	2	23.5	27.6
29	14	10	.5	3	27.5	29.3
30	13	17	.5	3	33.5	31.0
31	14	18	.5	4	36.5	33.2

APRIL 1955

Date	m.m.	c.m.	c.f.	c.b.	total	7 days moving average
1	14	15	45	4	36.5	35.2
2	14	20	.5	3	37.5	36.6
3	14	20	.5	3	37.5	37.0
4	14	20	.5	3	37.5	37.5
5	14	21	.5	2	37.5	37.6
6	12	21	.5	3	36.5	35.5
7	12	21	.5	3	36.5	38.9
8	14	23	.5	3	40.5	39.5
9	14	24	.5	3	41.5	40.5
10	14	24	.5	3	41.5	44.8
11	14	24	.5	4	42.5	45.8
12	14	25	.5	4	43.5	49.3
13	14	40	8.5	5	67.5	52
14	14	25	.5	4	43.5	54.6
15	14	35	11	5	65	55.9
16	14	30	11	5	60	54.4
17	14	30	11	5	60	54.4
18	13	26	7.5	5	51.5	55.5
19	13	29	10	5	57	53
20	11	27	1	5	44	51.4
21	12	30	3	5	50	49.6
22	11	32	.5	5	48.5	49
23	11	31	.5	5	49.5	46.2
24	11	30	.5	5	46.51	44.0
25	12	30	.5	5	47.5	43.0
26	12	23	.5	2	37.5	40.7
27	13	23	.5	2	38.5	39.5
28	14	24	.5	2	40.5	37.9
29	14	24	.5	3	41.5	37.7
30	14	15	35	3	33.5	37.6

MAY 1955

Date	m.m.	c.m.	c.f.	c.b.	total	7 days moving average
1	14	2o	.5	3	37.5	37.6
2	14	19	.5	3	36.5	36.2
3	14	19	.5	3	36.5	34.6
4	14	2o	.5	3	37.5	34.1
5	14	13	.5	3	3o.5	33.9
6	14	13		3	3o	33.7
7	14	13	.5	3	3o,5	33.4
8	12	18	.5	3	33.5	33.3
9	12	21	.5	2	35.5	34.6
1o	12	19	.5	3	34.5	35.2
11	13	22	.5	3	38.5	35.8
12	13	21	.5	3	37.5	36.2
13	12	19	.5	3	34.5	36.4
14	12	19	.5	3	34.5	36.8
15	12	21	.5	3	36.5	36.o
16	12	21	.5	3	36.5	35.2
17	13	21	.5	3	37.5	35
18	12	18	.5	2	32.5	35
19	12	17	.5	3	32.5	32.8
2o	12	18	.5	3	33.5	31
21	12	19	.5	3	34.5	29.2
22	12	7	.5	2	21.5	28
29	13	15	.5	1	29.5	29
3o	13	15	.5	1	29.5	28.2
31	13	14	.5	1	28.5	28

JUNE 1955

Date	m.m.	c.m.	c.f.	c.b.	total	7 days moving average
1	14	11	.5	1	26.5	27.6
2	14	10	1	1	26.0	27.3
3	14	11	.5	1	26.5	27.1
4	14	11	.5	1	27.5	27.1
5	15	11	.5	1	27.5	27.8
6	15	12	.5	1	28.5	27.6
7	15	12	.5	1	28.5	27.1
8	15	11	4.5	1	31.5	26.5
9	14	9	.5	1	24.5	26.2
10	14	7	.5	1	22.5	26.0
11	13	8	.5	1	22.5	24.8
12	14	8	.5	1	23.5	24.5
13	14	8	.5	1	23.5	23.9
14	14	4	.5	1	19.5	23.5
15	14	4	.5	1	19.5	23.2
16	13	4	.5	1	18.5	23.0
17	14	4	.5	1	19.5	22.8
18	14	5	.5	1	20.5	23.0
19	14	6	.5	1	21.5	25.2
20	14	6	.5	1	21.5	27.5
21	15	6	.5	1	22.5	28.6
22	15	18	.5	1	34.5	29.6
23	15	18	.5	1	34.5	30.2
24	15	11	,5	1	27.5	31.1
25	15	11	.5	1	27.5	33.6
26	15	09	.5	1	25.5	31.5
27	15	13	.5	1	29.5	34.3
28	14	23	.5	1	38.5	
29	14	22	.5	1	37.5	
30	14	37	.5	3	54.5	

August 1954.

Date	m.m	c.m.	c.f.	c.b.	total	seven days moving average
1						
2	4	39.5	7.5	15	66	56.00
3	4	13	1	4	22	56.66
4	5	35.5	3	14	57.5	57.00
5	5	37	3	12	57	58.00
6	4	43	6	14	67	62.83
7	4	44	10	17	75	68.20
8						
9	4	41	11	17	73	69.91
10	4	43	11	15	73	69.29
11	3	43	11	14	71	67.42
12	3	35	11	15	64	65.75
13	3	32.5	6.5.	10.6	52.5	64.34
14	3	39	9	16	67	63.17
15						
16	5	32	11	13	61	60.75
17	5	38	11	14	68	60.58
18	5	36	5	16	62	62.00
19	5	23	5.5	10.0	44	62.42
20	5	39	10	15.5	69.5	62.84
21	5	39	10	14	68	63.67
22						
23		37.5	10	13	65	66.08
24	5	39	10	15	69	67.21
25	5	38	12	16	71	66.67
26	5	34	11	14	64	66.84
27	5	33.5	11	14	63	66.58
28	5	36	12	15	68	65.17
29						
30	5	40	8	14	67	64.34
31	5	36	10	13	64	65.16

SEPTEMBER 1954.

Date	m.m	c.m	c.f	c.b	total	seven days moving average.
1	5	31	11	12	59	66.04
2	5	36	12	13	66	65.92
3	5	40	12	14	71	65.58
4	5	39.5	12	14	70.5	65.92
5						
6	5	35	10	13	63	65.00
7	5	35	10	14	64	63.25
8	5	34	10	14	63	63.12
9	5	32	4	10	51	63.08
10	5	36	10	14	65	63.24
11	5	36	10	14	65	64.25
12						
13	5	39	11	13	68	64.96
14	5	38	11	17	71	64.08
15	5	38	12	13	68	61.92
16	5	33	6	10.5	54.5	59.75
17	5	35	2	9	51	57.54
18	5	35	2	11	53	55.58
19						
20	5	34	2	13	54	54.88
21	5	34	6	13.5	58.5	55.92
22	5	33	7	12	57	57.08
23	5	33	6	13	57	58.17
24	5	36	7	13	61	59.45
25	5	34	8	10	57	60.34
26						
27	5	34	8	16	63	60.42
28	5	37	8	15	65	59.50
29	5	33	8	15	61	58.62
30	5	34	2	13	54	58.71

OCTOBER 1954.

Date	m.m.	c.m	c.f.	c.b.	total	seven days moving average.
1	5	35	2	11	53	59.00
2	5	35.5	2	12	54.5	59.42
3						
4	5	39.5	5	17	66.5	52.16
5	5	37	6	17	65	52.41
6	5	38	7	16	66	60.62
7	5	25	7	15	52	59.96
8	5	33	6	14	58	58.00
9	5	31	7	15	58	56.16
10						
11	5	31	6	13	55	55.75
12	5	29	5	14	53	55.84
13	5	31	6	14	56	55.34
14	5	32	6	14	57	55.08
15	4	32	4	14	54	55.34
16	4	32	5	15	56	55.75
17						
18	5	30	3	16	54	55.58
19	5	32	4	16	57	55.33
20	5	33	3	16	57	54.83
21	5	31	3	15	54	54.50
22	5	31	3	15	54	54.58
23	5	35	4	16	50	54.54
24					5	
25	5	30	4	17	56	54.83
26	5	30	4	17	56	55.16
27						
28	4	29.5	6	18	57.5	54.83
29	4	30	6	17	57	55.62
30	5	30	5	15	55	58.33
31	5	23	7	10	45	61.29

NOVEMBER 1954.

Date	m.m	c.m	c.f.	c.b.	total	seven days moving average.
1	6	34	9	21.5	70.5	64.12
2	6	36	7	25	74	66.58
3.	6	37	7	25	75	69.34
4	5	35.5	9	24	73.5	70.88
5	5	32	7	24	68	70.00
6	5	30	7	23	65	65.54
7						
8	5	35	5	24	69	60.96
9	5	35	5	20	65	60.16
10	5	19		6.5	30.5	60.75
11	5	35	5	18	63	61.34
12	6	39	5	19	69	61.83
13	6	36	5	22	71	65.54
14						
15	6	36	6	22	70	70.58
16	6	36	6	22	70	70.58
17	6	35	7	22	70	70.58
18	7	37	7	22	73	70.50
19	7	36	7	20	70	70.34
20	7	34	7	22	70	70.17
21						
22	6	36	7	21	70.	69.92
23	6	35	7	20	68	69.92
24	7	36	7	20	70	70.42
25	7	36	7	20	70	70.42
26	7	39	7	20	73	70.34
27	7	39	7	20	73	70.42
28						
29	7	35	7	18	67	69.92
30	7	36	8	19	70	68.75

DECEMBER 1954.

Date	m.m.	c.m.	c.f.	c.b.	total	seven days moving average
1	5	37	8	19	69	66.66
2	5	34	7	19	65	65.33
3	5	32	8	19	64	63.96
4	5	33	2	17	57	61.41
5						
6	6	41	2	18	67	59.66
7	6	37.5	2	8	53.5	58.58
8	6	39	2	8	55	58.00
9	6	40	3	9	58	57.50
10	5	41	3	9	58	57.46
11	5	41	2	8	56	58.42
12						
13	6	43	4	10	63	59.34
14	6	40	2	10	58	59.67
15	6	39	2	15	62	59.67
16	6	39	2	15	62	59.34
17	6	35	2	15	58	59.25
18	6	35	2	13	56	59.25
19						
20	[illegible]	34	1	17	58	58.92
21	6	37	1	17	61	58.79
22	6	35	1	17	59	58.08
23	6	36	1	18	61	56.75
24	5	34.5	1	17	57.5	55.16
25	5	31	1	11	48	53.58
26						
27	[illegible]	32	1	12	50	52.00
28	[illegible]	33	1	11	50	49.88
29	5	34	1	11	51	49.25
30	6	32	1	11	50	49.58
31	6	25	1	11	43	49.08

JANUARY 1955

Date	m.m.	c.m.	c.f.	c.b.	total	seven days moving average.
1	6	28	1	10	55	48.42
2						
3	6	31	1	9	47	47.66
4	6	30	1	10	47	47.58
5	6	29	1	10	46	47.25
6	6	29	1	10	46	46.34
7	6	30	1	9	46	45.75
8	6	31	1	10	48	45.42
9						
10	5	29	1	8	43	45.33
11	6	30	1	7	44	45.27
12	6	30	1	8	45	44.75
13	6	30	1	9	46	44.42
14	6	29	1	9	45	44.58
15	5	28	1	9	43	44.58
16						
17	5	29	1	9	44	44.58
18	5	30	1	9	45	44.75
19	6	28	1	9	44	44.66
20	6	31	1	9	47	43.50
21	6	30	1	9	46	41.42
22	6	26	1	8	41	40.25
23						
24	6	18	1	7	32	40.25
25	6	18	1	7	32	40.42
26	6	27	1	9	43	41.08
27	6	32	1	9	48	43.00
28	6	31	1	9	47	45.75
29	6	32	1	9	48	47.67
30						
31	6	32	1	9	48	48.25

FEBRUARY 1955.

Date	m.m.	c.m.	c.f.	c.b.	total	seven days moving average
1	6	33	1	9	49	48.58
2	6	33	1	9	49	49.00
3	6	34	1	9	50	49.58
4	6	34	1	9	50	49.58
5	6	34	1	9	50	49.75
6						
7	6	34	1	9	50	50.00
8	6	33	1	10	50	50.42
9	6	33	1	10	50	50.92
10	6	34	1	10	51	51.58
11	6	36	1	10	53	53.33
12	6	36	1	10	53	53.33
13						
14	5	37	1	11	54	54.16
15	5	38	1	12	56	54.84
16	6	37	1	12	56	55.67
17	6	37	1	11	55	57.08
18	6	39	1	11	57	59.00
19	7	39	1	12	59	61.00
20						
21	7	45	1	13	65	62.92
22	7	46	1	14	68	64.50
23	7	45	1	15	68	65.67
24	7	44	1	14	66	66.34
25	7	43	1	14	65	66.29
26	7	43	1	14	65	64.92
27						
28	7	44	2	14	67	62.84

MARCH 1955.

Date	m.m.	c.m.	c.m.	c.b.	total	seven days moving average.
1	7	42.5	2	14	65.5	60.84
2	7	31	2	14	54	58.66
3	7	32	2	14	55	56.25
4	7	32	2	11	52	53.62
5	7	32	2	11	52	50.16
6						
7	6	33	1	11	51	47.16
8	6	32	1	11	50	45.92
9	5	16	1	6	28	45.50
10	6	27	1	11	45	46.16
11	6	29	1	11	47	47.92
12	6	33	1	12	52	51.84
13						
14	6	41	1	11	59	54.37
15	6	43	1	13	63	55.33
16	5	43	1	13	62	57.50
17	5	28.5	1	13	41.5	59.40
18	6	41	1	14	62	60.54
19	6	42	1	14	63	61.12
20						
21	6	41.5	8	14	69.5	63.46
22	6	40	8	13.5	67.5	66.08
23	6	40.5	5	13	64.5	57.25
24	6	39	9	13	67	67.42
25	6	39	11	12	68	66.46
26	6	42	11	12	71	65.88
27						
28	6	34.5	10	13	[illegible]	64.92
29	6	34	10	12	62	64.00
30	6	34	10	13	63	63.67
31	6	29	9	13	57	63.62

APRIL 1954

Date	m.m.	c.m.	c.f.	c.b.	Total	Seven days' moving average
1	7	37	1o	13	67	64.75
2	7	38	1o,	13	68	67.42
3	7	35	1o	14	66	68.42
4	7	4o	11	15	73	7o.25
5	7	39	11	15	72	71.2o
6	7	4o	11	14	72	72.25
7	7	42	1o	15	74	72.67
8	7	41.5	9	15	72.5	71.17
9	7	42	1o	15	74	68.92
1o						
11	7	43	7	13	7o	67.42
12	7	33	4	13	57	66.46
13	7	34	7	12	6o	65.54
14	7	4o	3	13	68	64.38
15	7	42	4	14	67	64.21
16	7	41.5	6	14	68.5	65.16
17						
18	6	39.5	4	12	61.5	65.2o
19	6	42.5	4	11	63.5	64.54
2o	6	44	4	11	65	63.71
21	6	42.5	4	11	63.5	62.96
22	6	43.5	1	13	63.5	62.12
23	6	42	1	13	62	61.16
24						
25	5	4o	3	11	59	6o.29
26	5	39	1	11	56	59.25
27.	5	41	2	13	61	57.21
28	5	39	2	11	57	54.75
29	5	39.5	2	11	57.5	53.33
3o	5	29	2	7.5	43.5	52.oo

MAY 1955

Date	m.m.	c.m.	c.f.	c.b.	total	seven days moving average.
1						
2	7	32	1	8	48	50.84
3	7	34	1	8	50	50.12
4	7	36	1	7	51	50.38
5	7	38	1	7	53	51.42
6	7	38	1	7	53	52.20
7	7	36	1	7	51	52.66
8						
9	7	36	1	9	53	52.84
10	7	36.5	2	9	54.5	53.04
11	7	34	2	9	52	53.25
12	7	35	2	10	54	53.25
13	7	34.5	2	11	54.5	52.80
14	6	33	2	11	52	52.25
15						
16	5	35	2	10	52	51.15
17	6	32	2	10	50	51.04
18	7	32	2	9	5o	5o.84
19.	7	31	2	1o	5o	5o.64
2o	7	32	1	1o	5o	5o.34
21	7	36	1	1o	54	49.66
22						
23	7	33	1	9	5o	49.16
24	7	29	1	9	46	49.oo
25	7	29	1	9	46	48.75
26	7	28	4	9	48	48.12
27	7	3o	4	9	5o	48.41
28	7	32	4	8	51	
29						
3o	7	31	2	9	49	
31	7	29	2	9	47	

APPENDIX X

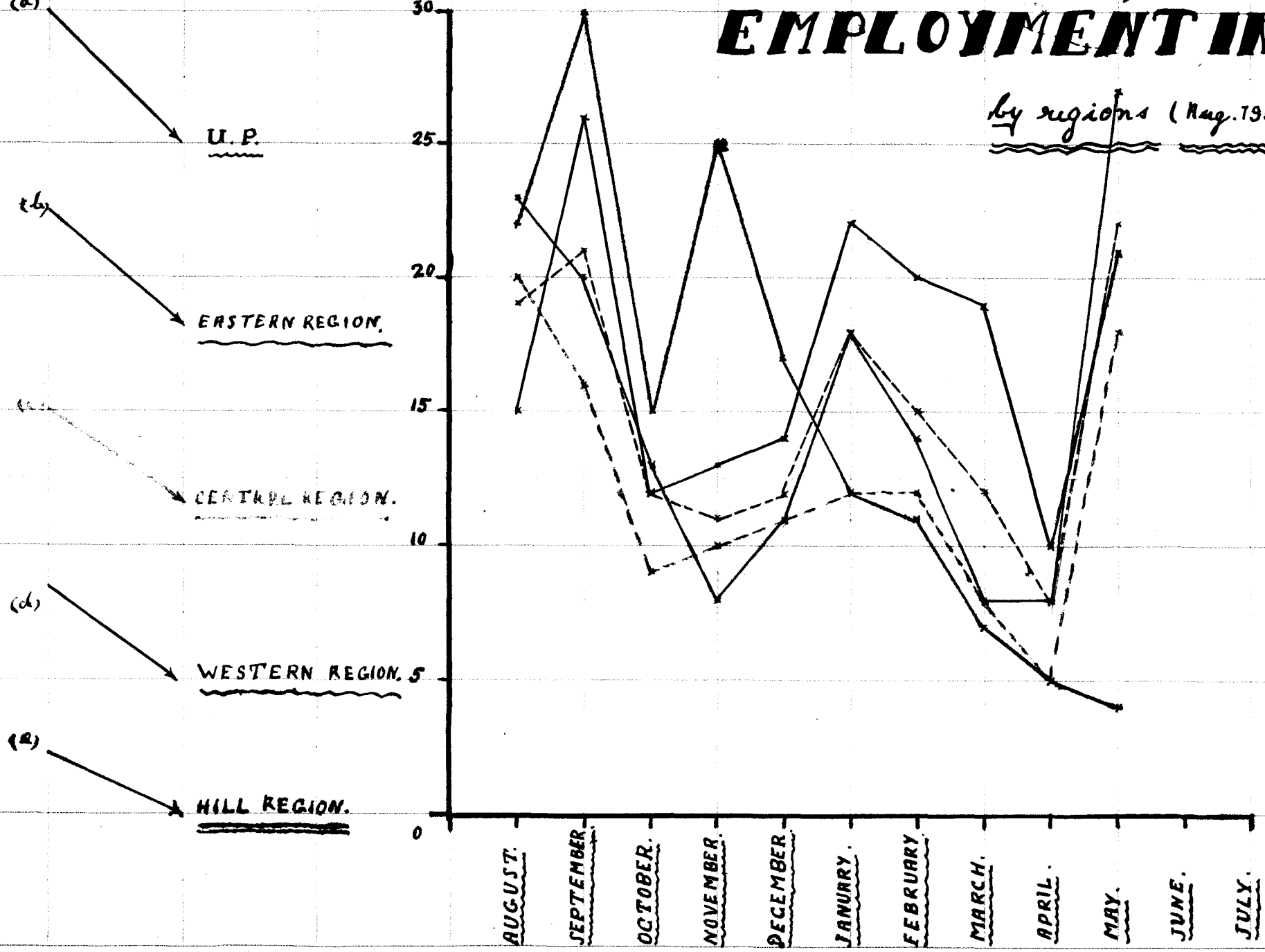
LOSS TO THE STATE FROM UNEMPLOYMENT AND UNDEREMPLOYMENT AUG. '55 - MAY '56.

Classes	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May
All classes U.P.	19	21	12	11	12	18	15	12	8	22
" Eastern Region	23	2o	13	8	11	18	14	8	8	27
" Central "	2o	16	9	1o	11	12	12	8	5	18
" Western "	15	26	12	13	14	22	2o	19	1o	21
" Hill "	22	3o	15	25	17	12	11	7	5	4
Cultivators U.P.	18	21	1o	9	11	16	14	1o	6	21
" Eastern Region	22	22	12	7	11	17	12	8	6	26
" Central "	19	15	8	7	9	12	12	7	4	18
" Western "	11	24	9	11	13	18	18	15	6	11
" Hill "	22	31	1o	26	19	14	11	7	6	4
Agricultural labourers U.P.	21	19	14	13	12	23	18	15	1o	28
" Eastern Region	22	14	14	9	7	18	16	5	8	32
" Central "	14	11	8	11	12	9	11	8	5	19
" Western "	24	32	18	2o	19	37	25	32	15	27
" Hill "	4	5	o	o	12	2o	28	14	o	o
Others U.P.	24	23	17	15	14	19	17	14	14	23
" Eastern Region	24	17	14	13	14	19	18	11	13	26
" Central "	34	26	17	19	18	16	12	13	12	19
" Western "	19	26	17	13	13	21	19	17	15	24
" Hill Region	-	24	34	25	9	5	7	4	6	5

Source: Monthly Bulletin of Statistics, Government of Uttar Pradesh; Department of Economics & Statistics.

MONTHLY RURAL UNDER-EMPLOYMENT IN U.P.

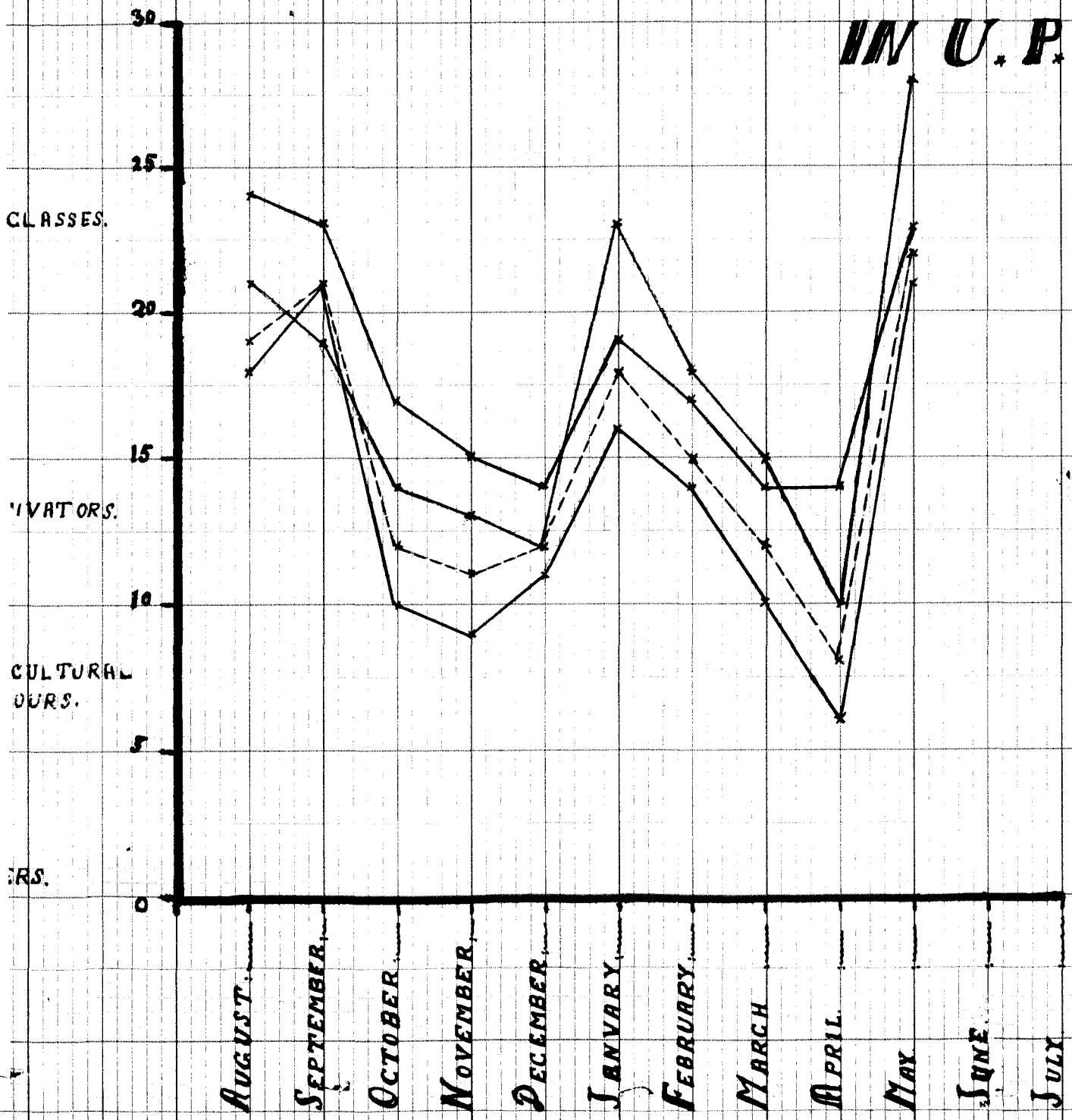
by regions (Aug. 1955 - May 1956.)



MONTHLY RURAL UNDER-EMPLOYMENT IN U.P.

by Class of occupation's

Aug 1955 May 1956



BIBLIOGRAPHY

BOOKS:

1. Keynes, J.M.: General Theory of Employment, Interest and Money; Harcourt, Brace and Co., New York, 1936.

2. Beveridge, W.H.: Full Employment in a Free Society, W.W. Norton and Co., New York, 1945.

3. " Unemployment a Problem for Industry, 1930.

4. Robinson, Joan: Essays in the Theory of Employment; The Macmillan Co., New York, 1937.

5. Ohlin, Bertil: The Problem of Employment Stabilisation, Columbia University Press, New York, 1949.

6. Fellner, William: Monetary Policies and Full Employment, University of California Press, Berkely, 1946.

7. Hobson, J.A.: The Economics of Employment, Allen and Unwin, Ltd., Londona, 1889.

8. Morgan Theodore: Income and Employment; Prentice-Hall, Inc. New York, 1947.

9. Oxford University, Institute of Statistics: The Economics of Full Employment: Six Studies in Applied Economics, Blackwell, Oxford, 1945.

0. Schultz, T. W.: Agriculture in an Unstable Economy, McGraw Hill Book Company, New York, 1945.

11. Simons, Henry: Economic Policy for a Free Society, University of Chicago Press, Chicago, 1948.

12. Bicanic, R: : Excess Population, Advancement of Science Vol.II. 1942.

13. Poniatowski,: Le Probleme du Surpeuplement dans l'agriculture Polonaise, L'Est European Agricole, 1936.

14. Oberlander: Die Agrarische Ubervolkerung Polens, Berlin, 1935.

15. Mandelbaum: Industrialisation of Backward Areas, 1945.

16. Moore, W.E.: Demographic Studies of Certain Areas of Rapid Growth, in Milbank Memorial Fund; 1944.

17. Dobb, M.: Soviet Economic Develo8ment Since 1917, 1948.

18. Cleland, W.: The Population in Egypt, 1936.

19. Leonard Hsu: China's Economic Stabilisation and Reconstruction, 1948.

20. Brookings Institution: America's Capacity to Produce, Washington, 1934.

22. Ramia, R.V. and Srivastva, C.P.: Agricultural Implements for Indian Farmers, ICAR, New Delhi, 1954.

23. FAO: Small Farm Implements, Rome, Italy, 1953.

24. FAO: Farm Mechanisation, Rome, Italy, 1952.

25. ILO: Action Against Unemployment, Geneva, 1950

25. U.N. TAP Survey of U.P. Handicrafts, New York, 1955.

26. U,N. Measures for Economic Development, Department of Economic Affairs, New York, 1951.

27. Sharma, S. P.,: Subhitra Krish Vigyan;Gautam Books Depot, Meerut, 1954.

28. Kaura, R.L.; Cattle Development in Uttar Pradesh, Directorate of Animal Husbandary, U.P. 1950.

29. Department of Economics and Statistics, Government of U.P.:

U.P. Through Figures, 1952.

30. Chaturvedi; Land Management in U.P.

31. Moreland, W.H.: Agriculture of the United Provinces, Government of Uttar Pradesh, 1912.

32. '' Agricultural conditions and Problems of the United Provinces, Government of Uttar Pradesh, 1911.

33. Das,'C.M.,: Studies in Agricultural Improvement with Special reference to the United Provinces, Government of Uttar Pradesh.

34. Nehrt,S.S.: Electro-Farming--New Experiments in - with Illustrations; Goverment of Uttar Pradesh.

BIBLIOGRAPHY

REPORTS

1. Census of India, 1951, Vol. I, India, Part II-B.

2. Census of India, Economic Tables, Paper No. 3, 1953; Summary of Demographic and Economic Data 1951 Census.

3. Census of India, 1951, Vol. II; Uttar Pradesh, Part II-B, Economic Tables.

4. Census of India 1951, Vol. II Uttar Pradesh, Part I-A:Report.

5. Estimates of Area and Production of Principal Crops in India 1951-52; Government of India, Ministry of Food and Agriculture.

6. Indian Livestock Census 1951 1951, Vol II, Directorate of Economics and Statistics, Ministry of Food and Agriculture: Government of India.

7. Indian Agricultural Statistics Vol: I, 1949-50; Government of of India, Ministry of Food and Agriculture.

8. Season and Crop Report: Department of Agriculture, Government of U.P.

9, Rural Manpower and Occupational Structure: Government of India, Ministry of Labour,

10. Report on Intensive Survey of Agricultural Labour, Government of India, Ministry of Labour, Vol. I; All India.

11. Agricultural Labour Enquiry, Ministry of Labour, Vol. II, North India.

12. Rural Wages in U.P.: Government of U.P., Department of Economics and Statistics.

BIBLIOGRAPHY

PERIODICALS AND PAPERS:

1. International Labour Review, Geneva, June 1952.

2. Indian Economic Review, Delhi School of Economics, Vol. I, Feb. 1952.

3. Food and Farming, New Delhi, 1952-56

4. Bulletin of Statistics, Department of Statistics, Government of Uttar Pradesh, June 1954-July 1956.

5. Agricultural Situation in India, Ministry of Food and Agriculture Government of India, 1952-56.

6. The Daily Statesman.

APPENDIX 1X

LABOUR REQUIREMENT EACH DAY ON JEHANGIRABAD-NIBLETT STATE MECHANISED FARM, 1954-55

JUNE 1954.

Date	m.m	c.m	c.f	c.b.	total	seven days moving average.
1	5	17	1	9	32	
2	5	14	1	8	28	
3	4	18	1	8	31	
4	5	18	1	8	32	28.43
5		7	1	5	13	28.57
6	5	16	1	8	30	29.57
7	5	18	3	7	33	29.86
8	5	21	1	6	33	30.00
9	5	22	3	5	35	33.14
10	4	20	3	6	33	34.57
11	4	19	1	9	33	35.71
12	4	20	1	10	35	36.57
13	4	23	3	10	40	37.71
14	4	25	1	11	41	39.43
15	5	24	1	9	39	40.79
16	5	27	1	10	43	41.79
17	5	29	1	10	45	41.64
18	5	26.5	1	10	42.5	42.64
19	5	25	1	11	42	43.93
20	5	23	1	10	39	45.50
21	5	35	6	14	48	47.64
22	5	24	5	14	48	50.29
23	5	26	7	16	54	53.00
24	5	26	10	19	60	56.29
25	5	29	10	17	61	58.14
26	5	29	10	17	61	60.14
27	5	27	11	19	62	59.86
28	5	27	11	18	61	59.14
29	5	25	14	18	62	59.29
30	5	25	5	17	52	59.29

JULY 1954.

Date	m.m	c.m	c.f.	c.b.	total	seven days moving average.
1	5	23.5	9.5	17.0	55.0	60.14
2	5	29.0	10.0	18.0	62.0	61.14
3	5	29.0	11.0	16.0	61.0	62.14
4	5	35.0	11.0	17.0	68.0	63.14
5	5	36.0	12.0	15.0	68.0	64.79
6	5	33.5	12.0	18.5	69.0	67.29
7	4	29.0	9.0	17.0	59.0	69.29
8	4	32.5	12.0	18.0	66.5	69.00
9	4	44.5	13.0	18.0	79.5	68.14
10	4	42.0	12.0	17.0	75.0	67.29
11	5	36.0	11.5	13.5	66.0	67.07
12	5	32.0	10.5	15.0	62.0	60.71
13	5	31.5	11.0	16.0	63.0	58.14
14	5	27.5	10.0	15.0	57.5	56.29
15	5	13.0	1.0	3.0	22.0	56.71
16	5	37.0	9.5	10.0	61.5	55.71
17	5	30.0	13.0	14.0	62.0	52.79
18	4	39.0	10.0	16.0	69.0	53.71
19	5	28.0	10.0	12.0	55.0	60.36
20	5	22.5	7.5	7.5	42.5	60.36
21	5	35.0	14.0	10.0	64.0	57.43
22	5	37.5	14.0	11.0	67.5	54.71
23	5	33.5	13.0	11.0	62.5	55.57
24	5	24.5	6.0	6.0	41.5	59.21
25	5	26.0	11.0	8.0	50.0	59.36
26	5	31.0	13.0	12.0	61.0	58.00
27	5	36.0	14.0	13.0	68.0	58.79
28	5	36.0	10.0	14.0	65.0	62.71
29	5	34.0	6.0	13.0	58.0	65.24
30	5	38.0	12.0	13.0	68.0	61.83
31	5	40.0	11.0	13.0	69.0	57.37